

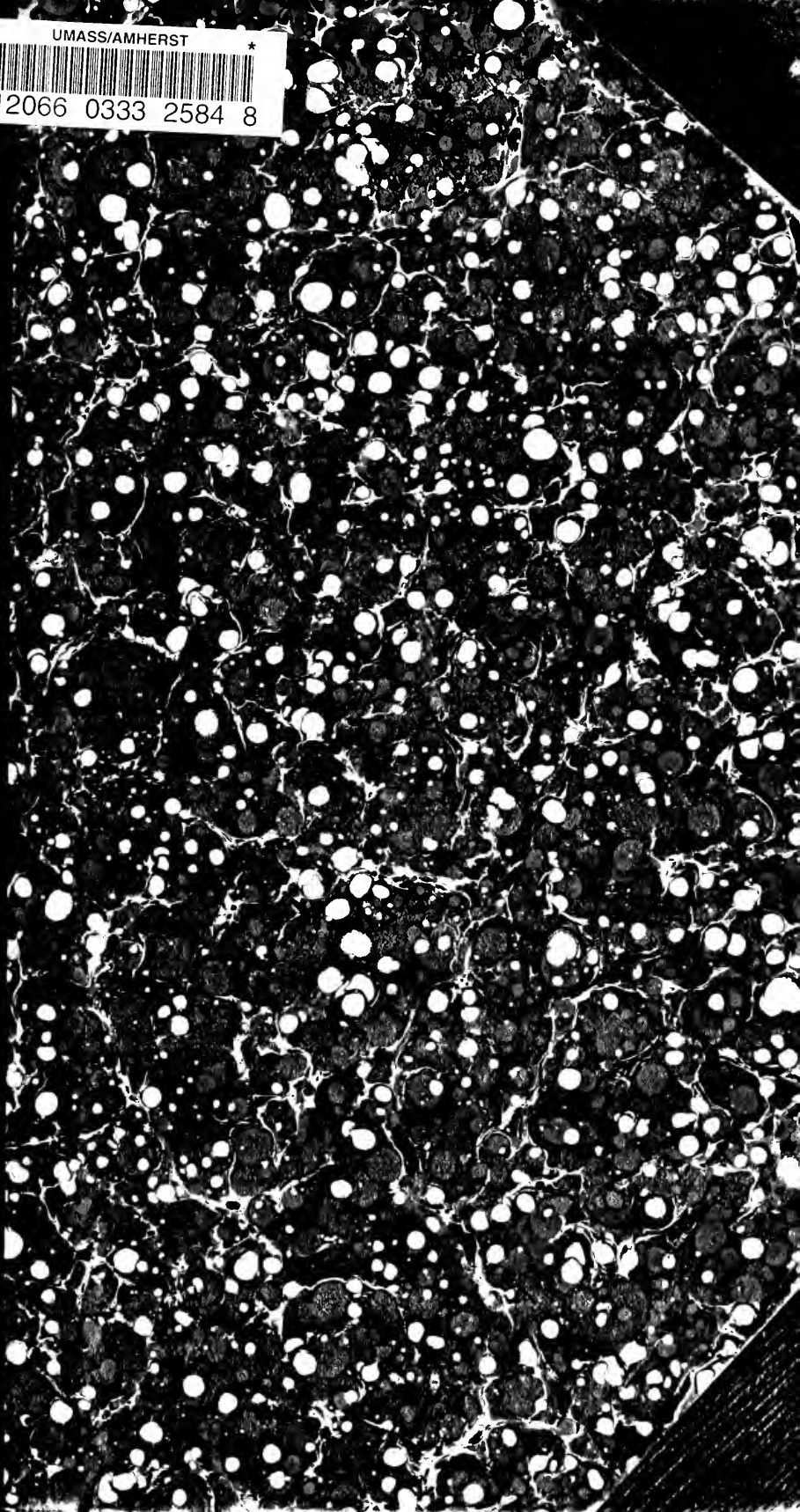
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BULLETIN No. 1.

MASSACHUSETTS
CROP REPORT

FOR THE

MONTH OF MAY, 1891.

COMPILED BY

WM. R. SESSIONS,
SECRETARY STATE BOARD OF AGRICULTURE.

BOSTON:

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CROP REPORT FOR THE MONTH OF MAY, 1891.

COMPILED FROM RETURNS TO THE OFFICE OF THE STATE BOARD OF
AGRICULTURE, MAY 28, 1891.

OFFICE STATE BOARD OF AGRICULTURE,
BOSTON, MASS., June 2, 1891.

With this number commences the series of crop reports for the season of 1891. It is the intent to issue at least six monthly bulletins during the season. These bulletins are compiled from data received from selected correspondents in different parts of the State by means of blanks sent to them monthly. For this issue one hundred and sixty such blanks were sent out.

Arrangements have also been made with weather observers in some seventeen localities in the State, and their data is received and compiled by an expert in such matters.

The bulletins will be mailed as issued to those who have received them in past seasons and to any others who make application for them. It is believed this kind of work is of value to those engaged in agricultural pursuits, and every effort will be made to make it as valuable as possible.

In the circular to correspondents returnable to this office May 28 the first question asked was, *How does the present season compare, agriculturally speaking, with last season?* Replies to this question were quite varied, and it is difficult to classify them. The general opinion seemed to be that the month of June this year opens under less favorable conditions, agriculturally speaking, than it did last year. The month of April was quite favorable. The month of May, 1890, was cool and wet, and several frosts occurred. This year May was decidedly cool and dry, with occasional frosts, which did considerable damage to fruit and early crops in many sections of the State.

The second question asked was, *Does the season now promise to be a favorable one for the farmer?* The correspondents were about evenly divided in their opinion as to the outlook for the future. In general, with much needed rain and warmer weather, the outlook would be fairly favorable.

The third question asked was, *What insects are doing the most damage in your neighborhood, and what measures, if any, are being taken to prevent their ravages?* Almost every correspondent reports the presence of the tent caterpillar. Some state that steps are taken by many farmers to destroy this pest, while others let it have its own way. Among the measures used to destroy it are burning, brushing down the nests, kerosene, smearing with gas tar, Paris green, and by using the hand bare or protected by gloves or sacking to tear the nests off. "The Holyoke Transcript," in a recent issue, says: "It is surprising that the farmers of this section permit their fruit trees to be stripped of leaves and young fruit, destroyed by the tent caterpillar. Not only is considerable damage done by the various worms, but the trees look unsightly, and give to the farms the appearance of being owned by a lazy man. In some trees as many as fifteen of these 'tents' can be seen, and whole branches of trees denuded of their leaves. They can be gotten rid of easily. The little care taken will more than pay for itself by the return of fruit and the appearance of the tree."

The fourth question asked was, *Is it difficult to get first-class help, and what wages are paid such per month?* Nearly all the correspondents report that it is quite difficult to get first-class farm help, and \$20 to \$25 per month and board would be a fair average of the wages paid.

The fifth question asked was, *What proportion of the neat stock in your vicinity is, in your opinion, affected with tuberculosis?* The answers to this question indicate that either the disease is far from being as common as has been supposed, or else it is so insidious in its nature that the majority of those having to do with cattle do not detect it until it is far advanced. Most of the correspondents state that very few, if any, cases exist in their vicinity, and none place the proportion over five per cent. A correspondent in southern

Worcester, however, states that it is said by reliable people that nearly one-tenth is affected. Quite a number state that they have never known of a case in their vicinity, while others believe it to exist but are unable to state to what extent. Some correspondents state that such cattle are becoming more common than formerly. A correspondent in central Franklin states that the disease is almost unknown in that open country. A correspondent in Essex states that very little is said of this disease in swine; that he kills nearly all the hogs in his town, and finds very many of them affected with tuberculosis in all stages of the disease, and that it grows more common every year. He thinks it safe to say that twenty-five per cent of all the hogs he has killed the past season were more or less affected with tuberculosis.

The sixth question asked was, *Does this disease appear to be more common in any particular breed of cattle, and under what system of care and feeding do you consider it most common?* A large number of the correspondents did not answer this question for the reason that they did not feel competent to do so intelligently. There was insufficient evidence offered to warrant the statement that the disease is confined to any particular breed of cattle. It is found more or less in all cattle, from the cow to the working ox. A correspondent in western Hampshire says it is often aggravated by exposure to inclement weather and diet of musty and unwholesome food. Another in central Hampshire says high feeding with concentrated feed and tight, warm barns tend to breed the disease. Another in central Worcester says, under the old system of cold barns and low feeding. Another in northern Worcester says high feed and tight stables and crossing with a feeble breed. Another in central Worcester says he thinks excessive high feeding with want of suitable ventilation is likely to develop the disease. One in southern Middlesex says that cows that are deep milkers seem to be more liable to the disease than poor milkers or dry stock. Another in northern Middlesex says profuse feeding and grain to stimulate the production of milk is evidently a cause of the disease. A correspondent in central Franklin says close confinement and filth. Another in eastern Hampden says the weaker the natural system the

more liable to have it; still fat cattle have it. A correspondent in central Norfolk says those high fed and kept in close barns. Another correspondent in western Worcester says his observation convinces him that the disease is not especially partial to any particular breed, but will be found more common among cows kept for milk. Another in central Essex says it is confined to no particular breed, but he believes it is most common where cattle are kept in badly ventilated stables and in large herds. Another in western Worcester does not believe the breed has anything to do with it, but that close confinement in poorly ventilated stables is the main cause. Another in western Franklin states that, so far as his observation goes, it is not confined to any particular breed, and is most common under the high pressure system of feeding and among animals kept closely confined without proper ventilation. Another in eastern Franklin, that it is most common with the Jerseys under high feeding and close confinement. Another in eastern Worcester, that high feeding or forcing in close stables, without exercising, and that we hear little of it during warm weather. Another in western Worcester, that it is not confined to any particular breed, but an animal that has not a particularly strong constitution and is of a great milking capacity fed high would, he thinks, be more likely to be affected than a beef animal. Another in southern Worcester, that the Jerseys are perhaps more affected, and that warm, close stables with a floor under which winter winds circulate are the places where the disease most prevails; also that cattle seem to thrive better if they have a warm floor to lie on, even if the air where they stand is below the freezing point. Another in central Hampden says, from observation should say most common in the Channel Island breeds under too close breeding and a forcing system of feeding. Others state that they do not think the feed has anything to do with it.

An article on the subject of tuberculosis will be found printed in the last pages of this bulletin.

THE WEATHER.

Meteorological Data for May.

STATION.	TEMPERATURE. DEG. F.					PRECIPITATION.		Prevailing Wind.	CLOUDINESS. † (0 to 10.) NO. OF DAYS.		
	Mean.	Maximum.	Date.	Minimum.	Date.	Total in Inches.	Days with Precipitation.		Cloudy.	Partly Cloudy.	Cloudless.
Amherst, .	54.8	86	10	25	6	1.82	8	N.W.	9	13	9
Boston, .	55.8	81	11	33	6	1.56	8	S. W.	8	16	7
Concord, .	55.3	87	10	28	5	1.63	7	S. W.	15	4	12
Dudley, .	56.2	87	11	27	6	1.24	6	S.	14	14	3
Fitchburg,*.	55.6	82	10, 11	35	5	1.79	7	W.	5	7	19
Framingham,	57.3	85	11	30	6, 19	2.17	6	—	—	—	—
Lawrence, .	57.1	89	10	30	6	2.48	7	S. W.	11	9	11
Middleboro',	54.0	82	10	24	6	2.19	8	S. W.	9	10	12
New Bedford,	54.1	78	10, 22	31	6	2.22	12	—	—	—	—
Princeton, .	—	—	—	26	6	2.10	6	W., N.W.	—	—	—
Provincetown,	53.6	75	11	35	6	1.69	7	—	—	—	—
Royalston, .	56.6	82	10	38	6	—	3	S. W.	17	11	3
Springfield, .	58.1	84	10, 11	31	6	2.18	7	S.	7	18	6
Taunton, .	55.9	87	11	25	6	2.62	9	S. W.	10	12	9
Worcester, .	53.8	84	11	29	6	—	5	—	—	—	—

* Temperature data from thermometer not self-registering.

† 0 to 3, cloudless; 4 to 7 inclusive, partly cloudy; 8 to 10, cloudy.

Summary.

Temperature (F).—Monthly mean, 51.9° . Highest monthly mean, 58.1° at Springfield; lowest monthly mean, 53.6° at Provincetown; maximum, 89° at Lawrence on the 10th; minimum, 24° at Middleborough on the 6th; range, 65° ; greatest local monthly range, 62° at Taunton; least local monthly range, 40° at Provincetown; greatest daily range, 49° at Amherst on the 10th; least daily range, 4° at Royalston on the 3d. Average temperature for May at Springfield for twenty-four years, 59.3° ; average for May, 1891, 58.9° ; departure, — 0.4° . Average temperature for May at Boston for twenty-one years, 56.2° ; average for May, 1891, 55.8° ; departure, — 0.4° .

Precipitation.—Average, 1.97 inches; greatest, 2.62 at Taunton; least, 1.24 at Dudley. Average for May at Springfield for forty-four years, 4.08; for May, 1891, 2.18; departure, — 1.90. Average for May at Boston for twenty-one years, 3.49; for May, 1891, 1.56; departure, — 1.93.

Prevailing Wind. — South-west.

Thunder-storms. — 11th, 12th, 15th, 16th, 26th.

Frost. — 4th, 5th, 6th, 7th, 19th, 24th, 28th.

Earthquake. — 1st (7.06 and 7.09 P.M.).

REMARKS.

The weather for Massachusetts for the month of May, 1891, was cold and dry, with a small number of rainy days and a slight excess of sunshine. The mean temperature was only slightly below the normal, but there were several extensive and severe frosts, the temperature on several mornings going below the freezing point of water. Ice formed, and ground froze to the depth of one inch in places on the 4th. On the 19th, frost was especially severe except on the immediate coast. The lowest temperatures were recorded on the 6th. The maximum temperatures occurred generally on the 10th or 11th.

The precipitation at seven stations in Massachusetts having records for more than ten years was 1.37 inches below the average.

The storms were, with one exception, poorly defined, and there were no marked changes in the barometric pressure, it remaining nearly normal throughout the month. The exception was the storm of the 16th, which ran north-easterly up our coast. Light snow squalls occurred in sections on the 6th.

The weather for New England since Jan. 1, 1891, may be characterized as warm and wet. January and February had an excess of temperature and precipitation and of cloudy weather; March had also an excess of temperature and precipitation, but the number of rainy days was below the average and there was an excess of sunshine. At the end of March, the spring was considered to be from a week to ten days ahead of the average. April was warm and dry, and the sunshine was in excess. The maximum and minimum temperatures for each month at the Boston Signal Office were: January, maximum, 56°; minimum, 4°; February, maximum, 62°; minimum, 5°; March, maximum, 55°; minimum, 3°; April, maximum, 78°; minimum, 27°; May, maximum, 81°; minimum, 33°. A heavy thunder-storm occurred in south-eastern Massachusetts on the evening of February 28, doing much damage by lightning. The snow-fall has been slightly in excess.

NOTES OF CORRESPONDENTS.

(Mailed to us May 28.)

BARNSTABLE COUNTY.

Dennis. — Think the season is later than the average. The warm spells are very short, and the nights are cold with frosts in some localities. The outlook for grass is not good, as we have had but little rain for six or eight weeks. The cranberry-vine worm is doing the most damage, and tobacco liquid is being used to a considerable extent. Caterpillars not as plenty as last year. Not much help hired by the month. Wages about \$25; day wages, \$1.50.

JOSHUA CROWELL.

Eastham. — Season started at least ten days earlier than last, but May has been cold and dry with frequent frosts. Fine rain to-day (29th). An increased acreage of potatoes and asparagus planted. Asparagus and potato beetles are doing the most damage; chickens for the former and Paris green for the latter. Help enough for the demand at \$20 per month.

J. A. CLARK.

Falmouth. — The hay crop will be very light. Frost the 23d froze vegetation in some parts of the town. The tent caterpillar is doing the most damage and is very plenty. I keep them off my trees by hand picking, which is the best way I've found. Help is not plenty.

D. R. WICKS.

Sandwich. — We have had but a few light showers since March, and the pastures are short and the prospect is for a very light hay crop. The frosts have set back early potatoes and damaged cranberry bogs considerably. Tent caterpillars are very plenty, and not much is being done except to burn them. Help mostly hired by the day at \$1.50.

J. R. HOLWAY.

BERKSHIRE COUNTY.

Becket. — Vegetation is very backward on account of cold, dry weather. So far we have had frost most every morning and it has killed early vegetables. It is difficult to get first-class help and wages are too high, — \$20 to \$25 per month and board.

W. H. SNOW.

Cheshire. — The present season as compared with last is cooler and more dry. It promises to be favorable for the farmer. The tent caterpillars are plenty, and in some sections farmers and others are destroying them while others let them carefully alone. It is very difficult to obtain first-class help. L. J. NORTHUP.

Dalton. — This season appears better than last season as regards prices of farm products. Think the season promises to be favorable for the farmer. Can see no reason why the farmers are not prosperous. Beef and butter are higher. More attention is being paid to horse breeding, using better stallions, and colts are selling well. Tent caterpillars are doing considerable damage, especially on wild cherry trees, and nothing is being done to prevent their ravages. First-class help is not plenty, and commands \$1.50 per day and \$20 per month (mostly American). W. B. BARTON.

Egremont. — Season compares favorably with last, and now promises to be a favorable one for the farmer. Very little damage is done by insects at this date. It is difficult to get first-class help at \$20 per month and board. J. H. ROWLEY.

Lee. — Present season compares unfavorably with last as but very little rain has fallen for weeks, and it is looking discouraging just at present. Many of the oats sown did not sprout, corn is slow in coming up; light frosts and cool weather prevail, but not severe enough to injure vegetables to any great extent. Help outside of regular monthly help is scarce. First-class help get \$38 per month and board themselves. A. BRADLEY.

BRISTOL COUNTY.

Dartmouth. — The season thus far has in this section been one of uncommon peculiarities, opening wet and cold, then dry and cold, with frost interspersed with a few very warm days and few showers; Sunday, 24th instant, heavy frost in places. The season does not promise to be a flattering one for the farmer. Tent caterpillars have been doing the most damage. The most of the inhabitants do nothing; others try to kill them by burning and other means, but it has been slow work they having hatched very unevenly. It is difficult to get first-class help, and such commands \$20 to \$30 per month. L. T. DAVIS.

North Raynham. — Season better in many respects than last, and now promises to be a favorable one for the farmer. The first part of the season things advanced rapidly, but a severe cold day

or two, with frost, killed early potatoes, corn and nearly all vegetables; and, on account of the cold weather since, much seed has not germinated. Many orchards are very badly infested with tent caterpillars, and very little pains are taken to destroy them. First-class help hard to get. N. W. SHAW.

Somerset. — April was much more favorable than last year, but May not near as favorable. With the exception of the hay crop the season now promises to be a favorable one for the farmer. The severe frosts in May have given vegetation a set back, and will make all early vegetables and fruits from one to two weeks later than last season. Tent caterpillars and strawberry fleas are the insects now doing the most damage. No system is adopted for exterminating them. First-class help is scarce, and is getting from \$22 to \$25 per month. JOSEPH GIBBS.

Swansea. — We need rain, without which grass will be light. Do not think the outlook as good as it was at this time last year. More corn than usual is planted. Many complain that their potatoes do not come up well. A frost the 23d did much damage to the strawberry crop. Tent caterpillars are doing the most damage. Some have destroyed them, but most people let them have their own way. First-class help is not plenty; such get from \$20 to \$22 per month. F. G. ARNOLD.

DUKES COUNTY.

West Tisbury. — We suffered from drought until May 26 when considerable rain fell. Another heavy storm on the 29th helped us still further, insuring nearly an average hay crop. Season not up to the average. The potato bug is almost the only insect that is at present injurious. Portuguese labor is quite abundant at \$10 to \$20 per month and board. WM. J. ROTCH.

ESSEX COUNTY.

Danvers. — The present season compares unfavorably with the same period last year. The hay crop will be very light; but, if we have rain now, other crops may do well. Tent caterpillars are doing the most damage; some burn them, some brush them down and others Paris green them. It is difficult to get first-class help; \$20 to \$22 for ordinary help. C. H. PRESTON.

Groveland. — Season opened some earlier than last, but has been dry and cold. Pears, plums, peaches and currants are doing

well. Apples not an average blossom. Grass somewhat winter killed and short for the season of the year. Corn and potatoes nearly all planted, and more are planted this year. Tent caterpillars are doing the most damage. Somewhat difficult to get first-class help. Wages about \$25 per month and board.

ABEL STICKNEY.

Haverhill. — We have had a month with but little rain and seeds come up slow. Late frosts have damaged potatoes, corn, beans and other early crops. If we have rain the outlook will be about as usual. Tent caterpillars are about the only insects with us now. First-class help hard to get at \$20 per month and board.

EBEN WEBSTER.

Ipswich. — Considerable grass roots were killed in this section, and meadows generally look unusually backward. Some complaint is made that potatoes do not come forward as fast as they should. Corn is growing well. The tent caterpillar and the canker worm are doing the most damage. For destroying the former the nests are taken off by hand, burning them off with a kerosene torch and by pouring kerosene on them; for the canker worm, spraying with Paris green and water. Good help is scarce. Wages \$20 to \$25 per month and board.

O. C. SMITH.

Topsfield. — There is more corn and potatoes planted this year than last. Season more dry than last; but, with the exception of the hay crop, now promises to be a favorable one for the farmer. Very few blossoms on Baldwin trees; others medium. Tent caterpillar most numerous; destroyed by picking, burning and spraying with Paris green, but none have been practiced to any great extent. First-class help hard to get. Wages from \$20 to \$25 per month.

B. P. PIKE.

FRANKLIN COUNTY.

Colrain. — The season was certainly earlier by two weeks, and had the usual amount of rain fallen would have been far in advance of former years. The frost of May 18 did much damage to fruit. The season does not now promise to be a favorable one for the farmer. It is difficult to get first-class help, and \$20 per month and board is given such.

A. A. SMITH.

Conway. — April was very warm and favorable to early crops, but May has been cold, windy and dry, with frosts. On the 18th a hard frost killed potatoes, corn and tomatoes. The feed in the

pasture is not as good as it was earlier. Farmers have generally planted their corn. Just now the season does not promise to be a favorable one for the farmer. Tent caterpillars are very plenty, and farmers are not doing much to destroy them. It is very difficult to get reliable help, and such get from \$20 to \$30 per month and board.

J. C. NEWHALL.

Erving. — Since the rains the season compares favorably with last, and should judge it to be about an average one. Tent caterpillars are doing the most damage. We burn their nests as much as possible. First-class help is difficult to get, and wages are \$18 to \$25 per month.

H. B. CLARK.

Hawley. — Season about the same as last, and the outlook is favorable for the farmer. It is pretty dry here, and cold nights with several light frosts lately. Good help is not very plenty, and such get \$20 to \$25 per month and board.

A. S. RICE.

Montague. — I think the season a little later than last, otherwise quite as favorable. Grass has suffered the most of anything from dry weather, and may be a rather light crop. Tent caterpillars have been somewhat numerous, but have done no serious damage. Some have destroyed them by picking or burning, but generally very little has been done to destroy them. It is very difficult to get first-class help, and such help commands from \$20 to \$25 per month and board.

C. S. RAYMOND.

Whately. — Season compares favorably with last, though it is very dry and the grass crop must be light. The wire worm is at work on the onion crop to some extent. First-class help is difficult to get, and costs from \$20 to \$22 per month and board.

FRANK DICKINSON.

HAMPDEN COUNTY.

Brimfield. — The frosts have done some damage to early crops and on fruit trees where the limbs were within five or six feet of the ground. Season as favorable as last year, except the drought which will trouble us if it does not rain soon. More tent caterpillars than for the last ten years combined. The measures taken to destroy them are burning and tearing down the nests. It is difficult to get first-class help. Wages for good men \$20 to \$25 per month and board.

S. W. BROWN.

Hampden. — Season a week or more earlier than last, but more dry. The present dry weather will tend to bring the alkalies to the surface which, with later rains, may prove a benefit to crops. Tent caterpillars are doing the most damage. The nests are picked off by hand or burnt by means of a cloth saturated with kerosene. Good help is scarce. Wages \$16 to \$24 per month.

J. N. ISHAM.

Tolland. — Season not as good as last year. Very cold and dry and very little grass yet. We cannot have good crops without rain soon. It froze here on the night of the 17th and 18th so as to make ice. Seed that is planted grows very slow if at all. Farmers hire as little as possible. Wages from \$15 to \$20 per month. Apple trees are in full bloom.

F. T. MOORE.

Russell. — Season not as good as last, and does not at the present time promise to be a favorable one for the farmer. Do not hear much of potato bugs. First-class help is not easily obtained and costs \$1.50 per day.

ROLAND PARKS.

West Springfield. — Farmers are feeling blue over light grass, slow growing corn and potatoes and the cool dry weather. Tobacco is increasing here. More corn and potatoes than usual have been planted and some are still ploughing for more. The tent caterpillars have been doing the most damage, but are now retiring. Burning, smearing with gas tar and crushing with the hand are the usual remedies. It is difficult to get first-class help. Wages \$18 to \$20 per month and board.

J. N. BAGG.

HAMPSHIRE COUNTY.

Amherst. — This season does not compare favorably with last, and does not now promise to be favorable for the farmer. Tent caterpillars are doing the most damage. They are being killed by burning with kerosene. First-class help is scarce, and commands \$20 per month and board. Crops of all kinds need rain.

C. E. WILSON.

Chesterfield. — On account of continued drought and frequent frosts the farmer has reason to be discouraged. The frost of the 27th was quite severe. The hay crop must be light, and spring seeding nearly a failure unless relief soon comes. The tent caterpillar we have in quantities, and some kill them by use of gunpowder and some remove them by hand. Help is not plenty. Wages about \$20 per month and board.

HORATIO BISBEE.

Hatfield. — Season two or three weeks later than last, and dry and cold. The nights still continue to fall near frost, and when I say that the outlook is favorable for the farmer it is because I expect, in consequence, continued and perhaps excessive hot weather sometime next month. At present no insects to trouble. It is difficult to get first-class help. Wages \$20 per month and board for eight months.

THADDEUS GRAVES.

North Hadley. — The weather has been dry and cold all the spring thus far, making the grass crop backward, and the prospect for a full crop is very poor. Planting is late and corn not coming well in many places. Onions and tobacco beds are not well stocked. Strawberries and many early vegetables were seriously damaged by frost. Tent caterpillars abound, and not much is being done to destroy them. Wages are higher than last year, and good help is not plenty.

H. C. RUSSELL.

Southampton. — Never saw the outlook better than it was on the 1st of May, but the absence of rain makes everything look dubious. Pasture feed is getting short, and mowing lots are stationary or going backward. Cool nights and occasional frost keep the farmer on the anxious seat most of the time. First-class help very scarce. Wages \$20 per month by the year.

C. B. LYMAN.

Pelham. — This season earlier and rather more promising than last, and now it promises to be a favorable one for the farmer. The tent caterpillar is quite numerous and destructive, but nothing is done to check its ravages. First-class help is scarce and commands \$20 per month.

J. L. BREWER.

NANTUCKET COUNTY.

Nantucket. — Season about the same as last, and think it now promises to be a favorable one for the farmer. The only insect making any show at present is the potato bug, and he is commencing his work. It is very difficult to get any decent help, and if you get first-class help they want the farm and all you raise.

C. W. GARDNER.

NORFOLK COUNTY.

Axon. — At present this season will compare favorably with last, and indications now point to an excellent season for the farmer. Most of the farmers of this section are engaged in producing milk for market, and pay but little attention to market gardening. Such help as is needed may be easily procured for \$20 to \$30 per month and board.

S. F. OLIVER.

Medfield. — Dry weather in April and May has retarded hoed crops and grass. Pastures are in bad shape. Frequent frosts have cut off vegetation that was up, except the most hardy. Grass is our main crop; milk the chief product. Unless grain should be decidedly lower next winter the outlook will not be encouraging. Some farmers are trying hard to do their duty in destroying the tent caterpillar; others do nothing. It is very difficult to get first-class help, and such get \$26 per month easily.

GEORGE R. CHASE.

Medway. — Season compares well with last, except for want of rain, which at present is promising mischief. Season promises to be a fairly favorable one for the farmer. Tent caterpillars are doing the most damage, and many neglect to remove the nests. First-class help is always scarce.

MONROE MORSE.

Millis. — Season started very favorably, but the drought and frosts have put it back. Season not so favorable for grass as last. Tent caterpillars are doing the most damage, and are destroyed by the usual methods. First-class help is difficult to get and commands \$20 and \$22 per month.

E. F. RICHARDSON.

Walpole. — Season very backward on account of frosts and cool weather. Grass is looking well now; much fruit ruined and early truck behind. Some corn plots have been planted three times on account of frosts, and other early crops have likewise suffered. Tent caterpillars are very numerous, the black knot is spreading on plum trees and other pests are fairly numerous. On account of some men not doing anything to exterminate pests they constantly increase. First-class help is scarce, and is worth about \$45 per month.

F. H. FAIRFIELD.

MIDDLESEX COUNTY.

Billerica. — Season not so early as last. Cold and dry, grass very late, pastures short, fruit not promising, milk low, grain high, crops grow slowly. A frost on night of May 18 cut off tomato plants, damaged strawberries, killed peach buds and hurt potatoes. Milk is one of our staples. With pastures short, soiling crops backward, grain high and price of milk 22 cents per can, the situation is not favorable. Tent caterpillars are doing the most damage, and are destroyed by burning, kerosene and Paris green. Currant worms are destroyed by white hellebore. First-class help very difficult to get at \$18 to \$22 per month and board for the season.

J. N. PARDEE.

Groton. — Season much dryer than the average. Vegetation full up to normal. Have had four severe frosts since May 15. Early vegetables have been impaired. Great loss by asparagus raisers and early vegetable growers. The outlook for the hay crop is very dubious. To a limited extent tent caterpillars are destroyed, but the wild cherry trees are everywhere loaded with them, and no one kills caterpillars on trees bordering the highways. Very difficult to get first-class help; wages \$18 to \$22.

DANIEL NEEDHAM.

Sherborn. — Owing to drought and frosts the crops are backward. With warm weather and rains the outlook would be good. Tent caterpillars and leaf rollers are doing the most damage. Caterpillars are being killed very generally with a stiff brush or simply a pole. Help is as plenty as usual and the quality is as good. Wages about \$20 per month and board.

N. B. DOUGLAS.

Winchester. — Crops started earlier, but frosts in May retarded growth. Season does not now promise to be a favorable one for the farmer, as May has been too dry and cold with high winds. It is difficult to get first-class help, and such commands \$20 to \$30 per month and board. There are regiments of poor, ignorant men, a great many old men, applying for work. Not one in a hundred can drive a horse or take care of one in a satisfactory manner. They have been working with pick and shovel or in the tanneries.

MARSHALL SYMMES.

PLYMOUTH COUNTY.

Kingston. — There have been but few warm days and they were sultry. Ice formed the evening of May 6 thicker than window glass. The month has been very dry and cold. At present the outlook is rather discouraging. The tent caterpillars are doing the most harm, and farmers are using various methods to destroy them. First-class help is rather scarce. Wages \$40 per month.

J. H. CUSHMAN.

Lakeville. — Grass, rye and oats at this time are looking well. There is a good prospect for an apple and pear crop. Strawberries have been injured some by frost. The tent caterpillar is doing the most damage. It is difficult to get first-class help, and such is paid \$20 per month and board.

E. CUSHMAN.

Marshfield. — On the whole the present season compares favorably with last season. In this locality the uplands are dry and

the hay crop may be short. The tent caterpillars are increasing. It is difficult to get first-class help, and wages are \$25 or \$30 per month.

G. J. PETERSON.

Wareham.—The spring has been cold and backward. May has been a dry month, and we are suffering from lack of rain. Frost has done some damage away from salt water. Almost impossible to get first-class help. Wages \$25 to \$40 per month and board. More attention is given to the culture of cranberries by small proprietors than ever before.

A. SAVARY.

West Bridgewater.—Season perhaps ten days earlier than last, more fruit blossoms, grass looking better. The season promises now to be a very favorable one for the farmer. The tent caterpillar and currant worm are doing the most damage now. First-class help is not difficult to get; commands \$20 per month.

F. E. HOWARD.

WORCESTER COUNTY.

Fitchburg.—Season eight days earlier than last. Apple bloom occurred May 15; average for thirty-five years May 23. Want of rain, but more especially deficient humidity, is very unfavorable. Season promises to be fairly favorable for the farmer. Tent caterpillars are doing the most damage, and only a few pay any attention to them. It is rather difficult to get first-class help, and such commands \$20 to \$25 per month and board.

Dr. JABEZ FISHER.

Hardwick.—With the one single exception of the grass crop the present indications are that this season will be more favorable than last. Does not promise now to be a favorable one for the farmers in this section, because the pastures and mowing lands are both badly winter killed and suffering for want of rain. The tent caterpillars are doing the most damage, and those who have any sense either remove them from the trees with gloved hands or burn them. It is very difficult to get first-class help. Twenty-six dollars per month is a fair average for the best for eight months of the year.

W. A. WARNER.

Harrard.—The season has been cold and dry. The feed and grass in pastures is short and dry, and considerable grass was winter killed by the ice which came and remained on the ground all winter. Mowing lots generally look spindling; we need rain very much. Do not consider the season ahead of last season. Tent caterpillars are doing damage, and do not see anything done

to prevent their ravages. It grows more troublesome every year to get good help. Wages \$17 to \$22 per month and board for such help as we can get. PRESTON KNIGHT.

Leominster. — The low temperature of May, and the small amount of rain that has fallen, begin to tell seriously on our grass crop, and the outlook is for a short crop. Fruit trees of all varieties are looking well. Planting is well along and will soon be finished. Early potatoes are ready for the hoe. It is difficult to get first-class help. Wages \$20 per month and board.

W. B. HOSMER.

Petersham. — Season compares favorably with last. There will be more fruit, more grass is promised, the season is two weeks earlier and promises to be a favorable one for the farmer. Farm work for the season is well advanced. A larger acreage of corn than usual is being planted. The blossoming of apples, pears and peaches promise an abundant crop of these fruits. The tent caterpillar is the only insect of consequence that has yet appeared. Various measures, as burning, poison, etc., have been taken to destroy them. First-class help hardly obtainable, and such could command \$30 per month and board. S. B. COOK.

Rutland. — Season commenced well, but the cold, dry weather of the past few weeks has been very unfavorable for the growth of crops, especially grass. About the usual amount and variety of crops are being planted. Pasturage at present is very poor indeed, and cows are generally shrinking on it. The dry weather has been favorable for planting and farmers are generally through. Apple trees are generally blossomed very full. Rather difficult to get first-class help. Wages \$18 to \$22 and board. A. L. MILES.

Southborough. — Season about the same as last. It is very dry. Grass is not looking well except on moist, rich land. A large acreage of corn is planted and has come up well. The frost injured early potatoes. Not difficult to get first-class help at \$20 to \$22 per month and board. E. F. COLLINS.

Worcester. — Grass, oats, rye, corn, potatoes and most other farm crops are very backward by reason of cold, dry weather and quite heavy frosts. Season does not promise now to be a favorable one for the farmer. The tent caterpillars are taken from the trees with a brush; kerosene is also applied. It is difficult to get first-class help, and such are paid \$25 per month and board.

S. A. BURGESS.

TUBERCULOSIS.

What it is.

* “This is a specific bacteridian affection, due to a bacillus, and characterized by a specific deposit of cells, large and small, in a special net-work, but without blood-vessels. It is situated by preference in the groups of lymphatic glands, or in the microscopic gland-like tissue of the different organs, and may be seen in all stages, from the simple redness and congestion in which the deposit is only commencing, through the solid grayish tubercle to the soft yellowish, cheese-like mass resulting from the softening of the latter.”

Names under which known.

† “This disease under one name or another has been known from the earliest times. According to ancient authors on medicine, as Hippocrates, 400 B. C., Aristotle, 330 B. C., Galen, 180 A. D., and others, it consisted of abscesses or ulcers in the lungs. This disease has been known by various names, as consumption, pulmonary consumption, tuberculous consumption, consumption of the bowels, phthisis, pulmonary phthisis, tuberculous phthisis, pulmonary ulceration, pining, wasting of the lungs, pearl disease, perlsucht, nymphomania, satyriasis, knots, kernels, grapes, angleberries, human tuberculosis, bovine tuberculosis, tubercle, miliary tubercle, tubercular disease and tuberculosis. The last name is more widely used at the present time than any of the others.”

Distribution.

† “Tuberculosis occurs in cattle wherever they are kept in domestication, but seems to be most prevalent where consumption is most common in the human family. It is almost unknown in Iceland, and is very rare in polar countries generally, but increases as we approach warm climates. It appears to be very common in Italy and Algeria; and,

* “The Farmer’s Veterinary Adviser,” Prof. James Law.

† Bulletin No. 3, Hatch Experiment Station of the Massachusetts Agricultural College, January, 1889, C. H. Fernald.

according to Fleming, it is becoming more common in England. It seems from all we can learn that a cold climate is less favorable to the development and propagation of tuberculosis than a warm or tropical one. Veith states that the disease does not occur in animals living in a wild condition, nor even in those which are in a semi-savage state. Spinola confirms this statement, and adds that the affection is unknown in the Russian steppes, and is rare in elevated regions. According to Zippelius, tuberculosis is most frequently developed in deep and narrow valleys, or in densely populated localities. The disease causes the greatest ravages in damp and dark dwellings with imperfect ventilation and drainage."

Organs attacked and how they appear.

* "Tubercles may be developed in any part of the body, as the lungs, their serous covering, the membrane supporting the bowels, the coats of the intestines, the throat, the spleen, the liver, the pancreas, the ovaries, the kidneys, the bones, especially the ends of long bones, and, in rare cases, the muscles and connective tissue."

† "Tuberculosis has been observed to attack nearly every organ in the body, but the lungs and lymphatic glands appear to be particularly subject to it. The tubercles in the lungs at first are small, semi-transparent, grayish, or colorless grains, varying from one-sixteenth to one-half an inch in diameter. These gradually increase in size and become yellowish or opaque. Several unite and form larger masses of a pale yellow color, and of a cheesy consistency, which finally soften and liquefy. These masses, often as large as a grape and sometimes even much larger, are more or less globular, and may fill the entire diseased portion of the lung, and exhibit a series of hemispherical elevations over the surface.

"The lining membrane of the thorax and abdomen, and also the membranes covering the brain and spinal cord, are subject to tubercular growths which appear like the pile on velvet, or wart-like growths over the surface. Not unfre-

* "The Farmer's Veterinary Adviser," Prof. James Law.

† Bulletin No. 3, Hatch Experiment Station, Massachusetts Agricultural College, January, 1889, C. H. Fernald.

quently joints become diseased, and, when opened, discharge a pale yellow granular matter."

* "1. Tuberculosis has been observed in all warm-blooded animals submitted to domesticity or deprived of their liberty. 2. Tuberculosis in animals and mankind presents analogous manifestations, in the living as in the dead creature. 3. The course and termination of the disease in mankind and animals is the same. 4. The masses of tubercle, and especially the sputa of the phthysical, produce tuberculosis in animals, when these matters are introduced through the respiratory or digestive apparatus, or through a deep wound. Tuberculosis, inoculated from man to animals, may in its turn be transmitted from one animal to another, and always produces tuberculosis. 5. Tuberculosis of man and of animals is transmitted by heredity. 6. The disease is contagious in man and animals. 7. There are clinical observations which prove the transmission of tuberculosis from animals to man, by the consumption of the milk of phthysical animals. 8. Tuberculosis of animals and man is rare in cold climates, where it does not even appear to be developed. It is most frequent in southern countries; the tracings of the geographical propagation of the disease in man and animals are nearly parallel. 9. It is evidently proved that a pathogenic microbe, having the same morphological and biological characters, exists in the tubercle of man and in that of animals. This organism, whether it be developed in man or animals, may induce tuberculosis when, cultivated in a pure state, it is conveyed to the animal possessing the necessary receptivity."

Symptoms.

† "The symptoms vary according to the seat of the deposit, yet there is a constitutional condition common to all, and the lungs are almost always involved in the latter stages, giving rise to a great similarity of symptoms. The disease may be acute but is usually chronic. The onset is insidious and easily overlooked, tubercles often being found in animals

* "Propagation of Tuberculosis," Lydtin, Fleming, Van Hertsen.

† "The Farmer's Veterinary Adviser," Prof. James Law.

killed in prime condition, and I have seen them in *parturition fever*, which is always attributed to plethora. There is some dulness, loss of vivacity, tenderness of the withers, back, and loins, and of the walls of the chest, occasional dryness of the nose, heat of the horns and ears, want of pliancy in the skin, slightly increased temperature (one hundred and two degrees), weak, accelerated pulse, mawkish breath, stiffness of the limbs, wandering perhaps from one to another, slight, infrequent, dry cough, and blue, watery milk, often abundant, but with cheesy matter, fat, and sugar decreased and soda and potassa in excess. The lymphatic glands about the throat are often manifestly enlarged. Swellings of the joints may appear, or a murmur harsher than natural may be heard over the lower end of the windpipe or in the chest. With deposits in the abdomen and especially in or near the ovaries of cows the desire for the male is often constant (*bullers*), though conception and the completion of gestation are usually impossible. Working oxen are easily overdone and become visibly emaciated from day to day. As the disease advances the eyes sink in their sockets and lose all animation; the skin is hidebound, harsh, dry and scurfy; the hair dull, dry and erect; the membranes of the eyes, nose, and mouth of a pale, yellow, bloodless aspect, though often streaked with pink vessels; a whitish discharge often takes place from the nose, and with it an increased repulsiveness and often distinct fœtor of the breath; if the bowels are involved scouring is common, and if the bones, swelling and lameness increase. Exhaustion with profuse perspiration and labored breathing occur on the slightest exertion, the appetite fails, tympany follows each meal, and the milk is at once poorer and lessened in quantity. The cough increases, becomes rattling, the discharge profuse, fetid, mixed with cheesy-like or chalky particles, crepitating, wheezing, gurgling and other abnormal noises are heard in the chest, and percussion shows dulness in particular parts with wincing. All of the symptoms become steadily aggravated, and the animal usually perishes from the difficulty of respiration or the profuse fetid diarrhœa. In cases affecting the bones, the patient may be unable to stand, and the bony prominences may make their way through the skin or even

crumble under the pressure thrown upon them. If the tubercle is deposited in liver, pancreas, or kidneys, there are symptoms of disease of these respective organs. Recoveries sometimes ensue in strong subjects, but more frequently the disease progresses to a fatal issue."

Causes.

* "The insidious nature of tuberculosis has perhaps had much to do with the comparative slowness with which professional and public attention has been directed to it, but the strides which it has made and the hold which it has gained on our stock render it one of the most, if not *the* most, important questions affecting the future well-being of the bovine species." Mr. Walley further states that in his opinion this increase is to be explained by multiplied consanguinity, by artificial feeding and manuring, by excessive forcing, and by early and over breeding. Walley gives as among the predisposing causes of this disease, the following: (1) Species of animals, (2) hereditary tendency, (3) breeding in-and-in, (4) breed, (5) early, late, and over breeding, (6) physical conformation, (7) climate and locality, (8) debility.

† "Close, badly aired buildings are among the most prolific causes of the disease, as are also changes to a colder climate, to a cold, exposed locality, or from a dry to a low, damp, undrained region. Finally, any cause which tends to wear out the general health tends to tuberculosis in a predisposed subject."

‡ "But the infectious principle, the cause, of the disease was entirely unknown until the announcement of Robert Koch, of Berlin, who, after a long series of experiments, proved beyond a shadow of a doubt that tuberculosis is due to the activity of a minute organism included among the bacteria; in other words, that the 'bacillus of tuberculosis' is the cause of this disease in all its forms, no matter where they occur. It is produced by this organism. It is never

* "Four Bovine Scourges," Thomas Walley, M. R. C. V. S.

† "The Farmer's Veterinary Adviser," Prof. James Law.

‡ Dr. H. C. Ernst before the Legislative Committee on Public Health, February, 1891.

produced *de novo*. It always comes by reason of the entrance of this organism into the human body, and it is distinctively and emphatically *an infectious disease*."

Treatment.

* "Treatment is unsatisfactory as being rarely successful, and even then in preserving an animal which is dangerous as a breeder for producing a progeny predisposed to this disease, and for slaughter and dairy purposes as possibly conveying the malady to man."

Prevention.

* "This would include drainage, shelter of pastures by trees, avoidance of changes to cold or damp localities, a warm, sunny location for farm buildings, suitable feeding and watering, the prevention and cure of all debilitating, and especially chronic diseases, protection against overwork, or excessive secretion of milk on a stimulating but insufficiently nutritious diet, securing young, undeveloped animals against breeding and milking at the same time, rejection of tuberculous subjects from breeding, the prompt removal of all such animals from pastures or buildings used for the healthy, and the thorough disinfection of all places where they have been kept."

† "A consideration of the causes furnishes the key-note to that of prevention, and all that can be said in the matter can be summarized in a few sentences: 1. All flesh and offal of affected animals, especially in the advanced stages of the disease, should be destroyed by fire or otherwise. 2. All suspected animals should be carefully isolated until pathognomonic signs have been developed. 3. All actually affected animals should be slaughtered. 4. All contaminated food, litter, etc., should be disinfected or burnt. 5. All infected houses should be disinfected. 6. No animal whose history is tainted, even in the slightest degree, or in whose system there exists the least suspicion of tubercle, should be used for breeding purposes. 7. Great care should be exercised at the period of birth to avoid any influences which will

* "The Farmer's Veterinary Adviser," Prof. James Law.

† "Four Bovine Scourges," Thomas Walley, M. R. C. V. S.

weaken the tissues in adultism. 8. Breeding animals should be carefully shielded — as far as is practicable — against debilitating influences of any kind. 9. The system of feeding and general management of our high-class stocks should be regulated on a more rational and conservative basis than that on which it at present rests."

Dr. Johne gives the following very sensible recommendations, which may prove useful to farmers and stock-breeders in stamping out this disease in their herds:—

"All tuberculous animals or those with tuberculous tendencies must be unconditionally excluded from breeding. All animals diseased with tuberculosis must be separated from healthy ones, and immediately slaughtered. Suspected ones should be treated in the same manner. Stables in which such animals have been kept must be thoroughly cleansed and disinfected. Everything tending to cause a predisposition to disease must be carefully avoided, and great care given to ventilation, diet, exercise and exposure."

Recent Action of the State Cattle Commission.

BOSTON, May 12, 1890.

To Boards of Health of Cities and Towns.

In accordance with the spirit and intent of the foregoing paper [see Annual Report, 1891], the undersigned issue the following regulation: In all cases of suspected tuberculosis among cattle coming to your notice, you will hereafter instruct owners to cause the separation of their suspected animals from the remainder of the herd, and cause their isolation, and allow the unsuspected animals to be managed in all respects as if no disease had been present.

LEVI STOCKBRIDGE,
A. W. CHEEVER,
O. B. HADWEN,

Cattle Commissioners of Massachusetts.

Milk from Tuberculous Cows.

The following results were reached by Dr. H. C. Ernst, Dr. Austin Peters and others, from experiments conducted recently at Mattapan, Boston, under the auspices of the Massachusetts Society for Promoting Agriculture:—

"1st, and emphatically, that the milk from cows affected with tuberculosis in any part of the body may contain the

virus of the disease. 2. That the virus is present whether there is disease of the udder or not. 3. That there is no ground for the assertion that there must be a lesion of the udder before the milk can contain the infection of tuberculosis. 4. That, on the contrary, the bacilli of tuberculosis are present and active in a very large proportion of cases in the milk of cows affected with tuberculosis but with no discoverable lesion of the udder."

Among other feeding experiments a litter of twelve healthy pigs, born of healthy parents, were fed with the milk from cows that had been used for experimenting in other directions; and, out of these twelve pigs, five showed tuberculosis, — that is, almost fifty per cent. Also twenty-three calves were used for feeding experiments. Calves that were born of healthy parents were taken before they had had milk from other sources at all, within twenty-four hours of the time of their birth, and placed upon the milk of these cows; and, of these, eight became tuberculous by the feeding experiments.

Reference Works.

The attention of the readers of this article is called to the following works: "Tuberculosis in Cattle," Dr. F. S. Billings, "Agriculture of Massachusetts," 1885; "Tuberculosis," Dr. Wm. Holbrook, "Agriculture of Massachusetts," 1889; "Tuberculosis," Dr. C. H. Fernald, Bulletin No. 3, Hatch Experiment Station of the Massachusetts Agricultural College, January, 1889; "How far may a Cow be Tuberculous before her Milk becomes Dangerous as an Article of Food?" Dr. H. C. Ernst, Bulletin No. 8, Hatch Experiment Station of the Massachusetts Agricultural College, April, 1890; "Dangers to Human Life from Bacilli of Tuberculosis in Milk," hearing before legislative committee on public health, February, 1891, issued by the Massachusetts Society for Promoting Agriculture; "Propagation of Tuberculosis," Lydtin, Fleming, Van Hertsen; "Bovine Tuberculosis in Man," Dr. Charles Creighton, London, 1881; "Annual Reports of Massachusetts Cattle Commission for 1889 and 1891," printed in the "Agriculture of Massachusetts" for 1888 and 1890.

MASSACHUSETTS
CROP REPORT

FOR THE

MONTH OF JUNE, 1891.

COMPILED BY

WM. R. SESSIONS,
SECRETARY STATE BOARD OF AGRICULTURE.

BOSTON:

WRIGHT & POTTER PRINTING CO., STATE PRINTERS,
18 POST OFFICE SQUARE.
1891.

CROP REPORT FOR THE MONTH OF JUNE, 1891.

COMPILED FROM RETURNS TO THE OFFICE OF THE STATE BOARD OF
AGRICULTURE, JUNE 29, 1891.

OFFICE STATE BOARD OF AGRICULTURE,
BOSTON, MASS., July 4, 1891.

Bulletin No. 2, Crop Report for the month of June, is herewith presented. These crop bulletins are compiled from data received from selected correspondents in different parts of the State, by means of blanks sent to them monthly. For this issue one hundred and sixty-four such blanks were sent out, and one hundred and twenty-six were returned in time to be incorporated in the bulletin.

The weather data, from observers in some seventeen localities in the State, are received and compiled by an expert in such matters.

These crop bulletins will be mailed as issued to those who have received them in past seasons, and to any others who make application for them. It is believed this kind of work is of value to those engaged in agricultural pursuits, and every effort will be made to make it as valuable as possible. In the circular to correspondents returnable to this office June 29, the first question asked was: "How does the season compare with same date last year?" On account of the changeableness of the season, the frosts of last month and the early part of this month, and the drought following, some crops are unusually well advanced while others are quite backward. It is believed that on the whole the present season compares favorably with last season.

The second question asked was: "How is Indian corn looking, and is the acreage in your vicinity greater than last

year?" The general opinion seemed to be that Indian corn at present is looking very well. Much of it is backward on account of cool, dry weather. In general the acreage is increased over that of last year. Some correspondents report the acreage this year to be twice that of last. According to the report of the Secretary of Agriculture, Washington, 1890, the number of acres of corn in this Commonwealth last year was 54,134, yielding 1,868,000 bushels, valued at \$1,307,336. According to the same authority there were in 1888 twelve acres of corn for every thousand acres of land surface.

The third question asked was: "Has haying commenced, and what is the prospect for a crop?" Haying has very generally commenced, but grass being late and the weather unfavorable for curing but little has been secured thus far. It is expected, if the weather be favorable, that haying will commence in earnest the week following July 4. The crop throughout the State is considerably less than that of last year. On moist, newly seeded lands the crop generally promises to be quite good, while on old meadows and on high, dry land it will be small. It is estimated that the crop will be about three-fourths of an average. Complaint is made of injury to standing grass, particularly to June grass, by an insect which causes the tops to turn white before blossoming.

* This insect is a species of thrips (*Limothrips poaphagus*, Com.), a minute, orange-colored insect which conceals itself beneath the sheath of the upper leaf, where it feeds on the stem just above the upper joint, completely killing the stem above, so that by haying time at least one-fourth of the grass is dead and worthless. The insect escapes from the stalk before the "turning white," and nothing can be done, economically, to destroy the insect itself. It would be advisable to discontinue the cultivation of grasses injured by it in localities where the damage done by it is large.

The fourth question asked was: "Do early potatoes promise well, and is the acreage in your vicinity greater than last year?" Most of the correspondents state that early potatoes are looking very well, although some report that

they are somewhat uneven, owing to failure of seed to come up. Judging by the reports received it is estimated that the acreage is considerably greater than that of last year.

The fifth question asked was: "How do dairy products compare in quantity, quality and price with same date last year?" The answers to this question were quite varied. The general opinion seemed to be that dairy products have been a little less in quantity, of about the same quality, and a little better as to prices received.

The sixth question asked was: "What is the outlook for small fruits, and specify the principal ones grown in your town and probable crop compared with previous years?" Generally speaking the outlook for small fruits is from fair to good. The principal kinds grown are strawberries, blackberries, raspberries, grapes, currants, cranberries and cherries. On account of frosts at the time of blossoming and dry weather at time of fruiting the strawberry crop was greatly injured in some sections and probably the crop, as a whole, was not over two-thirds of an average. Blackberries and raspberries promise good crops. Grapes also promise well. There was complaint from certain sections of apples and pears dropping from the trees, and the outlook was for small crops. For some unexplained reason Baldwin trees failed to blossom and the crop of apples will be mostly of other sorts.

An article descriptive of the gypsy moth, containing a brief outline of the work of extermination, will be found printed in the last pages of this bulletin.

THE WEATHER.
Meteorological Data for June, 1891.

STATION.	• TEMPERATURE. DEG. F.					PRECIPITATION.		Prevailing Wind.	CLOUDINESS. * (0 to 10.) No. of Days.		
	Mean.	Maximum.	Date.	Minimum.	Date.	Total in Inches.	Days with Precipitation.		Cloudy.	Partly Cloudy.	Cloudless.
Amherst, .	65.3	93	16	34	5	4.61	8	N. E.	8	16	6
Boston, .	65.0	96	16	45	5	3.06	6	W	—	—	—
Concord, .	64.0	96	16	37	5	3.43	10	S. W.	12	6	12
Dudley, .	69.0	93	16	44	4, 5	1.94	5	W.	11	8	11
Fitchburg, †	65.3	93	16	44	4	3.48	11	W.	8	8	14
Framingham, .	60.2	96	16	38	5	3.37	9	—	—	—	—
Ipswich, .	65.0	97	16	43	4, 5	4.47	8	N. W.	13	9	8
Lawrence, .	67.0	99	16	41	5	3.30	8	N. W.	10	9	11
Middleboro', .	60.7	93	16	34	5	1.85	7	S. W.	11	10	9
Nantucket, .	60.0	76	8	43	18	2.83	9	S. W.	10	9	11
New Bedford, .	63.8	94	16	38	6	1.63	9	—	—	—	—
Princeton, .	—	92	16	41	4	4.99	7	W.	—	—	—
Provincetown, .	62.6	92	16	39	5	2.14	8	—	—	—	—
Royalston, .	67.4	96	16	48	4	5.88	6	N. W.	19	4	7
Springfield, .	67.7	97	16	40	5	3.50	8	N.	9	12	9
Taunton, .	65.4	99	16	37	5	1.91	6	S. W.	12	7	11

* 0 to 3, cloudless; 4 to 7 inclusive, partly cloudy; 8 to 10, cloudy.

† Temperature data from thermometer not self-registering.

Summary.

Temperature (F.).—Monthly mean, 64.6°. Highest monthly mean, 69.0° at Dudley; lowest monthly mean, 60.0° at Nantucket; maximum, 99° at Lawrence and Taunton on the 16th; minimum, 34° at Middleborough on the 5th; range, 65°; greatest local monthly range, 62° at Taunton; least local monthly range, 33° at Nantucket; greatest daily range, 44° at Amherst on the 8th; least daily range, 1° at Ipswich on the 20th. Average temperature for June at Springfield for twenty-four years, 68.6°; average for June, 1891, 67.7°; departure, —0.9°. Average temperature for June at Boston for twenty years, 65.6°; average for June, 1891, 65.0°; departure, —0.6°.

Precipitation.—Average, 3.40 inches; greatest, 5.88 at Royalston; least, 1.63 at New Bedford. Average for June at Springfield for forty-four years, 3.79; for June, 1891, 3.50;

departure, — 0.29. Average for June at Boston for twenty years, 3.28 ; for June, 1891, 3.06 ; departure, — 0.22.

Prevailing Wind. — South-west.

Thunder-storms. — 1st, 2d, 3d, 16th, 22d, 26th.

Frost. — 5th and 6th (light).

Lunar Halo. — 11th.

High Winds. — Royalston, 27th.

REMARKS.

Although the average temperature and total precipitation during June, 1891, varied very little from the normal, in Massachusetts, the extremes of heat and cold and of drought and moisture were well marked. Hot, muggy weather and heavy rains with thunder-storm occurred on the 2d and night of the 3d, as a long, low pressure area moved easterly over New England. The temperature fell rapidly on the 4th, under the influence of cool north-westerly winds, reaching the minimum for the month on the evening of the 5th. A general frost occurred on that morning, though its evil effects were somewhat checked by a thick fog that spread over most low lands. From the 5th to the 16th the weather was generally fair, with only an occasional trace of rain on the 12th, and with steadily increasing temperature from day to day. On the 16th the temperature reached nearly 100°, except at Nantucket. This degree of heat is almost unprecedented so early in the month. The drying winds that prevailed helped to make the drought very severe. The temperature fell rapidly on the 17th, and copious rains fell till the 23d, being particularly heavy on the 22d. Threatening weather, with occasional rain and low temperature, continued till the end of the month. On the 26th a thunder-storm moved easterly over southern New England, accompanied in the Connecticut River valley by considerable hail. It reached western Massachusetts at a little before noon and travelled at the rate of about fifty miles an hour, spreading out and decreasing in energy after it crossed the Connecticut valley. At Chicopee, hail stones were found over one inch in diameter. One-half inch of rain and hail fell at Springfield. At Fiskdale, 1.12 inches of rain fell in twenty-five minutes. At East Haddam, Conn., a team of eight oxen were struck by lightning and five of them killed.

NOTES OF CORRESPONDENTS.

(Mailed to us June 29.)

BERKSHIRE COUNTY.

Becket (W. H. SNOW). — Season has been cold and dry, and some crops are backward. Corn is looking well and acreage is greater than last year. Haying has not commenced yet, and will not until after July 4. Very light crop, but is growing fast at present. Early potatoes are looking well. Quantity of milk is less; price of butter fully as high as last year. Apple trees set full, and as yet apples have not fallen off much. The outlook for small fruits is good.

Dalton (W. B. BARTON, Jr.). — Indian corn is looking well; fully as large acreage as last year and more ensilage. Haying has commenced, and the prospect for a crop is good, though some will be later than last year. Early potatoes are looking well and the acreage is very large. Cherries appear to be a fair crop. Plums set well, but are rotting some. Strawberries are plenty. I believe everything looks better than one year ago. There will be as much hay; corn is certainly a week earlier; apples have set well and promise a large crop; beef is high; the creamery paid for butter four and one-fourth cents more per pound for March and seven cents more per pound for April than last year.

Cheshire (L. J. NORTHUP). — The season as compared with last year is about the same. Indian corn is looking fairly well, with acreage about as last year. As a general thing haying has not commenced. Early potatoes promise well, and I think the acreage greater than last year. Dairy products do not vary much from last season. The outlook for small fruits, such as strawberries, cherries, plums, etc., is promising.

Lee (A. BRADLEY). — For grass and corn the season is ten days later than last. Corn stands well. Haying has not commenced. For the last ten days grass has grown wonderfully, but will be light on old meadows and sandy soil. Early potatoes promise well at this date; acreage larger than last year. Dairying is grow-

ing in favor; prices a little better and more firm. Apples promise more than an average at this date. Strawberries have done well. At this date the farmer has reason to rejoice over the fruit and crop prospect.

Sandisfield (GEO. A. SHEPARD). — Crops are not quite as forward as last year, being checked by drought. Corn stands well, but is a little backward, with acreage about the same. A few have commenced haying. Think the crop will fall short of last year's nearly one-third. Prospect fair for early potatoes, though potato bugs are troublesome. Dairy products increased over last year: quality first class and sales quick. The price for butter will average thus far two cents per pound more than last year. Huckleberries will be abundant and blackberries promise well.

Sheffield (DWIGHT ANDREWS). — Season much dryer than last. Indian corn is looking finely and crop is larger than last year. Haying has not commenced and the crop will be light. Early potatoes promise well; acreage greater than last year. Dairy products a trifle better than last season. The apple and pear crops will not be very large. There is a prospect for a good crop of peaches.

FRANKLIN COUNTY.

Buckland (J. D. AVERY). — Season more backward than last and has been quite dry. Corn is looking fairly well, though rather backward; think the acreage one-fourth greater than last year. Haying has commenced in earnest. A few small farmers are already through. Think there will be three-fourths of a crop and the quality must be excellent. Early potatoes are looking fairly well, and the acreage must be one-fourth greater than last year. Dairy products about the same as last year in quantity and price somewhat better. Small fruits are grown only to a limited extent.

Conway (J. C. NEWHALL). — The season thus far has been very changeable, from heat to cold and wet to dry, with a great deal of strong wind. Corn is looking very well at this time: the stand is good and the acreage is greater than last year. Some commenced haying the 22d; most will begin the 29th. I think the hay crop will be one-fourth less, but the quality will be good. Early potatoes not quite up to the average, though there are some very good pieces. Dairy products more in quantity than last year, good in quality: price of butter about two cents higher than a year ago. Apples, pears, cherries and plums will not be average crops. Apples seem to be dropping from the trees.

Deerfield (CHARLES JONES). — Season about one week later than last year. Corn is looking fairly well. It came up very slowly, but has done well since and a little more is planted than last year.

Early potatoes look well, and the acreage is greater than last year. The outlook for small fruits is good, with about the usual amount raised. Tobacco is all set and is looking well. Onions are not as good as last year, but are growing well.

Leverett (W. L. BOUTWELL). — Season a little later than last. Corn looks well; acreage larger than last year. Haying has commenced, with prospect of about three-fourths of an average crop. Early potatoes looking finely; acreage about the same as last year. Not enough small fruits raised to comment on. Rain fell last month in time to prevent any serious damage to anything except grass, and all crops are now looking finely.

Northfield (CHARLES POMEROY). — Season about one week later than last. Corn not as forward as last year. Since last week's rain it has taken a rapid growth. Very little grass has been cut; it is not as good as last year and on old fields is much lighter. Early potatoes are not as forward as last year; think the acreage greater. The price of butter has been higher at our creamery up to the 1st of June than last year, with an increase in production. Apples will probably not be one-fourth of a crop, as frost injured them. Pears and grapes are looking well.

Orange (ANSEL HARRINGTON). — Season cooler, and about a week later than last. Corn is looking well, but is rather backward, with acreage rather larger than last year. Very little haying done yet, and the prospect is fair for an average crop. Early potatoes promise very well, and the acreage is larger than last year. Outlook for small fruits is very poor. Apples in this vicinity were very much damaged by late frosts. Rose bugs are very troublesome.

HAMPSHIRE COUNTY.

Amherst (C. E. WILSON). — Indian corn is looking well and twice the acreage of last year. Haying has commenced with about two-thirds of a crop. Early potatoes promise well, with twice the acreage of last year. Quantity and quality of dairy products about the same as last year, with prices better. The outlook for small fruits is poor. The cold weather and frosts in the latter part of the spring decreased the product of small fruits. Old hay has advanced five dollars per ton.

Goshen (ALVAN BARRUS). — Season much dryer, and very changeable from heat to cold. Indian corn not large, but is looking well. There is at least a full average acreage. Some early pieces of grass are being cut, but the hay crop will not be over three-fourths of last year's crop. Early potatoes are looking well and a full crop has been planted. There has been a little improve-

ment in dairy products in all respects. Of cultivated strawberries there is a fair crop, but wild ones were killed by late frosts. Cherries and raspberries nearly a failure. The apple crop will be light. There is a tendency to blight in the barley crop.

Northampton (D. A. HORTON). — Season not quite as forward as last. Corn is looking fairly well, and about the same acreage as last year. Haying has commenced. On newly seeded and highly cultivated land, crop fairly good; a good deal of our meadows promises no more than two-thirds of a crop. The acreage of early potatoes is greater than last year and they look well. Dairy products about the same as last year in quantity, quality and price. Outlook for small fruits good; strawberries the principal. Apples and pears look well. Tobacco is looking finely, and now bids fair to be a large crop.

Southampton (C. B. LYMAN). — Corn is looking fairly well, with increased acreage. Haying commenced the past week. Grass on newly seeded and highly manured lands is very good; on old and neglected lots is light. Early potatoes are looking very well, with an increased acreage. Dairy products fully up to last year in quantity and price better. Think the apple crop will be light. Peaches and grapes set well. Berries suffered from drought. Pastures are looking better than on June 1.

South Hadley (H. W. GAYLORD). — Season later than last. Corn ten days late; acreage fifteen to twenty per cent greater than last year. Clover only has been cut. Grass is growing finely now. General haying will commence about July 6. Early potatoes promise well; acreage one-fourth greater than last year. Quantity of dairy products rather less; prices five to ten per cent above last year's. Strawberries one-half a crop. Currants a little better. Raspberries and blackberries promise well.

HAMPDEN COUNTY.

Blandford (E. W. BOISE). — The stand of corn is good, with about one-tenth more planted than usual. Haying generally deferred until the week following July 4. On rich lands a fair cut is assured. All potatoes are looking well; if anything the acreage is not as large as last year. All report that cows are doing well this season. Most of the butter made in this section is weekly delivered in valley markets. Apples are looking well. Seeds sown or planted have germinated well. While we have had dry weather drought has not affected us as badly as in valley towns, and the prospect now is for full average crops.

Brimfield (S. W. BROWN). — Some ten days ago, when the rain came, things had begun to look badly, but that rain and showers

we have had since have made the prospect for grass much better. As a rule grass will not be fit to cut for eight or ten days later than last year. Oats look better than last year. Indian corn as a rule is good, with acreage about the same as last year. Early potatoes look the best for years. Price of butter a little higher than last year. Outlook not good for small fruits; none grown for market.

Ludlow (C. B. BENNETT). — Indian corn is looking very well, with a third more planted than last year. Scarcely any hay has been cut. There is a fair crop on moist manured land, but dry upland is a failure. Early potatoes look well; acreage about the same as last year. Milk and butter are not as plenty as last year; prices about the same. Outlook is quite good for small fruits. The rain of two weeks ago changed the entire face of nature.

West Springfield (N. T. SMITH). — Season about a week later than last. Weather dry, with extremes of heat and cold. Indian corn looks well, but is rather backward. Sweet corn came up poorly and has grown slower than usual. The acreage of corn has increased some fifteen per cent. Haying has commenced; will not be over two-thirds of an average crop. Fields of June grass were white from ravages of the maggot in the stalks, and now some fields of timothy are fast turning white from the same cause. Early potatoes are looking promisingly, but the soil is too dry for a large crop; some ten per cent increase in acreage. Potato bugs are plenty. Improvement in dairy products, except in quantity. Strawberries a poor crop, with a few exceptions; cherries good; raspberries, blackberries and currants fully up to the average.

WORCESTER COUNTY.

Barre (J. L. SMITH). — Season not as forward as last. Indian corn is looking well; acreage one-fourth greater than last year. Only a few have begun haying. The crop will not be more than two-thirds as large as last year's. The weather is good for a second crop. Early potatoes are looking finely and not many bugs; acreage very much larger than last year. Not as much milk produced as last year; price one cent per can better than last year and very little surplus.

Berlin (P. B. SOUTHWICK). — Corn is looking fairly well; acreage about the same as last year. Little haying has been done, and the prospect is for a light crop. Early potatoes are looking finely; think the acreage considerably larger than last year. Should say dairy products are less in quantity than last year, and in quality and price about the same. Outlook for small fruits

fair. Principal small fruits grown are strawberries, raspberries and grapes.

Douglas (GEO. M. WALLIS). — Indian corn looks fairly well; acreage fully up to last year. Haying has commenced; crop about one-half of last year's; quality better. Early potatoes look very well; acreage one-tenth greater than last year. Dairy products about the same as last year in quantity and price. Strawberries fair. Cranberries and grapes are in full bloom. Wild berries promise a good crop.

Fitchburg (DR. JABEZ FISHER). — Judging by the data furnished by the Concord grape the season is seven days earlier than 1890, or the average for thirty-five years past. Cut orchard grass June 15; seventy per cent of last year's yield. Other grasses promise about the same or perhaps a little more. Early potatoes promise well; acreage greater than last year. Strawberries are yielding better than last year. Good promise for other berries.

New Braintree (C. D. SAGE). — Corn generally is looking well; acreage one-fourth greater than last year. Very little grass has been cut. Recently seeded fields will cut a fair crop, eight to nine tenths. Old mowings winter-killed and injured by dry weather. Acreage of early potatoes about the same as last year; are looking well, but are not as early as last year. Less milk and butter made; prices better and butter twenty per cent higher than last year.

Oakham (JESSE ALLEN). — Season more backward than last. Indian corn is looking well; larger acreage than last year. Haying has commenced; promises to be perhaps two-thirds of a crop. Early potatoes promise well; acreage greater than last year. Quantity of dairy products a little less than last year; price higher. Outlook for small fruits is good. Principal ones grown in this town are strawberries, currants, blackberries and huckleberries.

Petersham (S. B. COOK). — Corn is looking well; acreage greater than last year. Haying has commenced, and the prospect is that the crop will be much lighter than last year. Early potatoes are looking splendidly; acreage about the same as last year. Dairy products about the same as last year. The outlook is favorable for small fruits. Strawberries, raspberries and currants are as abundant as in previous years.

Templeton (LUCIEN GOVE). — Season as a whole later than last. Indian corn not as forward as last year at same date; acreage greater. Haying has commenced; crop one-third less than last year and of poorer quality. Early potatoes promise well. Less milk, more cream, quality excellent; price of butter higher than last year by three cents per pound. Outlook is good for small fruits. Strawberries, raspberries and blackberries equal to the average of

years. Rain on the 4th; a frost on the 5th, killing vegetables in many instances; then hot and dry up to the 17th: then rainy, cool and cloudy to the 23d; then hot for two days; then much colder: the month closing cold. Thermometer on the 5th registered 37°; on the 16th, 94°; on the 18th, 47°. Pastures are short. Crop of apples will be light.

Upton (B. A. JOURDAN).—Season from seven to ten days earlier than last. Corn is looking finely, and the acreage is larger than last year. Haying has not commenced. The prospect is for a fair crop, which I think is worth as much to the farmer, as the quality is better than last year. Early potatoes are looking finely; increased acreage. Outlook poor for small fruits. No one here cultivates them very largely. No apples.

Warren (W. E. PATRICK).—Season is backward as compared with last year. Indian corn is looking finely; acreage considerably greater than last year. A few have commenced haying; prospect is that the crop will not be over two-thirds that of last year. Grass on low lands improving very fast now where not winter-killed. Early potatoes are looking extra well. Dairy products less in quantity; quality much better, with a perceptible advance in prices over last year. Shall expect good crops of oats, rye and barley. Pasture feed is not as plenty as usual at this season of the year.

Worcester (H. R. KINNEY).—Crops are not quite as forward as last year. Corn looks well but is late; acreage greater than last year. Farmers are just beginning to cut out the roadsides and corners. Old fields of grass are very light; newly seeded fair to good. Early potatoes are uneven in many fields; no apparent increase in acreage over last year. Milk was very short during the hot, dry weather, but is more plenty now. Strawberries will be the lightest crop for several years. Other small fruits look well.

MIDDLESEX COUNTY.

Ashby (G. B. SIMONDS).—Season not as early as last year. Corn came up well but is backward; acreage larger than last year. No haying done yet. Hay crop generally lighter than last year, but quality better if properly secured. Acreage of early potatoes larger, but prospect for crop not as good as last year. Quantity of dairy products less than last year; quality fully as good, prices a little better. Strawberries, blackberries and raspberries are the principal small fruits in this vicinity; outlook for two first is good, but for raspberries below the average. Apple orchards are looking very healthy; very heavy foliage and no disease apparent at this date, but next to no fruit at all. The culture of grapes is

carried on to quite an extent in this locality, and the prospect for a crop is, I think, generally fully as good as at same date last year.

Chelmsford (P. P. PERHAM). — Season quite as forward as at same date last year, and most crops are looking very well. Indian corn looks finely, and the acreage is greater than last year. The abundance of rain last week will bring out the hay crop in good shape, but will delay the cutting at least one week. People who thought awhile ago there would not be half a crop have now changed their minds. Acreage of early potatoes about the same as last year; crop promises well. More milk produced than in some years; price about the same. Outlook for small fruits is good.

Concord (WM. H. HUNT). — The season has been a mixed one. Corn is late; otherwise is looking well, with a slight increase in acreage. Very few fields of grass have been cut. The crop on old fields on light land will be very light, although the rains have helped them some. Newly seeded fields on low lands are looking well. Very early fields of early potatoes were cut by frosts; otherwise looking well. Strawberries three-fourths of a full crop. Most fields were in bloom so as to be injured by two heavy frosts, which took all the blossoms out.

Groton (DANIEL NEEDHAM). — Corn looks very well; acreage the same as last year. Haying has commenced, and the prospect of a seventy-five per cent crop is assured; it may be larger. Early potatoes promise well; acreage about the same as last year. Dairy products less in quantity than last year; as good in quality; better in price. Recent rains have protected the small fruits. The crop of berries will be large. We have had one frost during the month which injured potatoes on low lands. The month to the 22d was the driest June I ever knew. At that date all crops in this locality were threatened with great peril. On the 22d came two inches of water, and grass and all vegetation renewed its life, and now the promise of compensating field and garden crops is very good.

Sherborn (N. B. DOUGLAS). — Corn looks well, and more has been planted than usual. Haying has commenced. The hay crop is very light; not more than one-half of last year's yield. Early potatoes look fairly well; acreage about the same as last year. Cows are not giving as much milk as last year; prices of dairy products about the same. Strawberries, cherries and raspberries grown quite large. The former very light; the two latter full crops. More land devoted to stover corn, hungarian, etc., for forage this year than I ever saw before. Cranberries promise a full crop. Apples nearly a total failure.

ESSEX COUNTY.

Danvers (C. H. PRESTON). — Season compares fairly well with the same date last year. Indian corn looks well; acreage about the same as last year. Haying has commenced and there will be a small crop. Early potatoes are looking well. Milk same price as last year. Small fruits promise well. The principal ones grown here are strawberries, blackberries and currants. The rain was a great help to the strawberry crop, which otherwise would have been a partial failure.

Groveland (ABEL STICKNEY). — Season not quite as early as last. Corn is looking finely; should think acreage one-fifth more. Haying has commenced, but on account of bad weather slow progress has been made. Prospect for crop better than a month ago. Early potatoes are looking uncommonly well; acreage not much greater than last year. Outlook for small fruits is good. Pasture huckleberries and blueberries more than usual.

North Andover (PETER HOLT, Jr.). — Grass and most crops are from a week to ten days late. Corn looks small and backward; acreage about the same as last year. Haying has commenced. The hay crop is not as good as last year, although the late rains have very much improved it. The acreage of early potatoes is fully as great as last year, but in many cases they did not come up well. The outlook for small fruits is favorable; the cultivation increases every year; principal ones are strawberries, blackberries, raspberries and currants. On almost any farm small fruits are grown to a greater or less extent for home use if not for market.

Topsfield (B. P. PIKE). — Season not as forward as last year. Corn is looking well; increased acreage. Haying has not commenced to any extent; crop not more than three-fourths of an average one. Early potatoes did not come up well; acreage increased. No dairy products but milk; less quantity; same price. Small fruits are looking well, though not many are grown for market. Apples did not set well, and what did set are falling off badly, and the same is true of pears.

West Newbury (J. C. TARLETON). — Season a little later than last year at this time. The acreage of Indian corn is much larger than last year. Haying has not commenced, and I do not think there will be more than two-thirds of a crop. The acreage of early potatoes is larger than last year, and just now the crop is looking well. Prices of dairy products are a little better than last year, but the quantity not so large. The strawberry crop is the principal small fruit crop grown in this vicinity, and this year they ripen very slowly, and I do not think there will be as large a crop as in years past, for many beds were killed out by the cold weather.

NORFOLK COUNTY.

Acron (S. F. OLIVER). — Most of the corn grown here is for the silo. Haying has commenced, and the crop, though not quite so heavy, is far better in quality than last year. Early potatoes now promise a good yield. Dairy products are on the increase both in quantity and quality, while prices do not vary very much. Strawberries and cherries are the principal small fruits, and they have been of excellent quality. Apples and pears are looking very well now.

Franklin (C. M. ALLEN). — Season not as favorable as last. Corn is looking well; average acreage. But little haying has been done; a three-fourths crop. Early potatoes promise well; acreage slightly greater than last year. Dairy products less in quantity than last year; five per cent higher in price. Strawberry crop not as good as last year. Raspberries and blackberries wintered well; are fruiting very heavily and are looking finely.

Medfield (GEO. R. CHASE). — Season less favorable than at same date last year. Corn is looking well; acreage larger than last year. Haying, except upon light land, has not commenced. Crop will be less than one-half of the great crop of last year, except on very wet land or on newly seeded land. Early potatoes promise well and the acreage is greater than last year. In quantity of dairy products I note little change: quality and price better than same date last year; at least goods move easier. There is a growing demand for cream in summer, which farmers should cultivate. Small fruits are poor in quality; half a crop in quantity. Strawberries lead, yet this is not a small fruit town.

Medway (MONROE MORSE). — Corn is looking fairly well, though the stand is not quite satisfactory; acreage increased ten per cent over last year. Very little hay is cut, and the crop will not be up to the average in quantity. Potatoes promise well and the acreage is increased. Dry weather lessened the flow of milk; prices are higher. Small fruits except strawberries promise good crops, and blackberries and raspberries will be more than average crops. Rose bugs are doing much damage. Spraying with Bordeaux mixture helps to drive them off of grape vines.

BRISTOL COUNTY.

Dighton (A. W. PAUL). — Season about the same as last year. Corn is small, but looks well. A few have commenced haying; perhaps two-thirds of a crop of inferior quality. Many early potatoes failed to come up; some increase in acreage. Butter is

higher. Milk mostly sold in the cities. Strawberries are a little more than half a crop. It has been the most disastrous year for strawberry raisers we have ever had. They were never more promising than up to June 1. Then the drought and hot weather burnt them. This was followed by a cold, north-east storm, which filled them with water and blasted and mildewed them. They are our money crop, and their failure has produced a feeling of despondency.

Mansfield (D. E. HARDING). — Season not as favorable as last year. Corn is looking finely, with acreage about the same as last year. Haying has commenced, with the crop very light on high ground and fair on low. Early potatoes are looking quite well; acreage does not vary very much. Small fruits are abundant.

Rapinham (N. W. SHAW). — Think the season is a week earlier at least than last. Corn is looking well. Haying commenced about June 24, and the crop will probably be an average one. The acreage of early potatoes is much greater than last year, but the dry spell affected them seriously. Strawberries are the principal small fruit grown, and owing to the lack of rain at one time the prospect was very poor, but the rain came in season to revive many fields, so that with the increase of acreage the crop has far exceeded the production of any previous year; prices have not been satisfactory. Rose bugs are very numerous, and there is danger that the grape crop will be destroyed by them.

Swansey (F. G. ARNOLD). — Corn is looking well; acreage about double. Haying commenced June 21; about two-thirds of an ordinary crop. Early potatoes look very well; acreage about the same as last year. We sell milk, and the supply is less than the same date last year, with price the same as last year. Strawberries are the principal small fruit and the crop was shortened by drought. Very dry weather until June 18.

PLYMOUTH COUNTY.

Kingston (J. H. CUSHMAN). — The season compares well with last year except for pastures and high grass land. Corn looks well but is late, owing to dry weather. Haying commenced about the 16th. Hay crop on high ground very light, but since the rains the crop on low land is looking well. Early potatoes never looked as well as now, and there is a much greater acreage. Strawberries almost a failure; huckleberries will be good if it is wet.

Marshfield (G. J. PETERSON). — It is an average season and all crops are doing well. Corn is looking well and the acreage is greater than last year. The hay crop is lighter than last year and

the rains have damaged the crop already cut. Early potatoes promise better than last year. The demand for good butter and milk increases, and the price likewise. Strawberries are scarce and high in price. The crop near the shore, where the frosts did not fall, is very good. On the whole the farmer is encouraged, and no calamity threatens the crops.

Lakeville (ELBRIDGE CUSHMAN). — There is no marked difference in this season as compared with last. Corn is looking fairly well; acreage about the same as last year. Haying has commenced, with not more than one-half a crop on high ground, but on low ground, on account of recent rains, the crop will be about an average. Potatoes are looking fairly well; acreage about the same as last year. Milk is not as plenty as last year at this date; prices of dairy products have not advanced. Pears have set well. Apples do not promise an abundant crop. The outlook for small fruits is good.

Rochester (GEO. H. WELD). — Season about the same as last. Corn not as forward as last year at this time; about the same acreage planted. Haying commenced June 10, much earlier than usual. There will be about one-half as much hay as last year. Early potatoes are looking well; acreage about the same as last year. Dairy products about the same as last year. Small fruits are looking well. Strawberries are now at their height; about half a crop of them.

West Bridgewater (F. E. HOWARD). — The thermometer averaged for twenty-nine days, in June this year, at five o'clock A.M., $55\frac{1}{2}^{\circ}$; for the same number of days last year, taken at the same hour, $55\frac{2}{3}^{\circ}$. The lowest temperature this year was June 5, 38° ; last year June 3, 44° . The highest this year was June 16, 96° . Indian corn though slow in coming up is looking well, and the acreage is greater than last year. Haying has commenced, and the crop will be considerably less than an average one. Early potatoes promise well, and the acreage is greater than last year. Prospect quite good for small fruits.

BARNSTABLE COUNTY.

Brewster (J. H. CLARK). — Corn is looking well, and about the same acreage as last year. Haying has commenced; crop about two-thirds of last year's crop (which was very large), though nearly up to the average. Early potatoes promise well; acreage a little larger. Dairy products about the same as last year. Outlook for small fruits very good except for cranberries, the principal one grown. Should think this crop would be below the

average owing principally to the frost the first week in June. Vegetation of all kinds is now looking well.

Dennis (JOSHUA CROWELL). — Season about the same as last. We have experienced two extreme and sudden changes of temperature this month, and to-day (June 27) the temperature is nearer the average of October than that of June. Indian corn fair; acreage not greater than last year. Haying has commenced; crop, except upon low ground, not much over one-half of last year's. Early potatoes are looking well; acreage probably greater than last year and potato slugs plenty. Too early to estimate cranberry crop, though it is looking fair for this date.

Sandwich (J. R. HOLWAY). — Corn is backward, with a larger acreage than last year. Haying began about the 15th, and there will be half a crop or less on most meadows. Acreage of early potatoes about the same as last year, and they promise fairly well. Dairy products below the average in quantity and price. The season has been remarkably cold and dry, with but few warm days and several very sudden changes in temperature.

DUKES COUNTY.

West Tisbury (WM. J. ROTCH). — Corn is looking well, with acreage somewhat greater than last year. Haying has commenced. The May rains were entirely insufficient, and the crop of English hay will not be over one-half that of last year. Early potatoes promise well, with larger acreage than last year. Many strawberries suffered from drought. For other fruits the prospect is fair.

NANTUCKET COUNTY.

Nantucket (C. W. GARDNER). — This season much cooler than last and very much dryer. Corn is looking well, but not so forward as last year; acreage one-third more. Haying commenced the 16th on the light lands. On the 17th we had heavy rains and the outlook on the meadows is very much better since, but the crop as a whole will be light. Potatoes are looking well and the acreage fifty per cent greater than last season. Most of the potatoes are early. Dairy products fully up to last year. No small fruits; strawberries mostly spoiled by the frosts.

THE GYPSY MOTH

(*Ocneria dispar* L.).

FROM SPECIAL BULLETIN HATCH EXPERIMENT STATION, NOVEMBER,
1889, C. H. FERNALD.

“On the 27th of last June, during my absence in Europe, several caterpillars were received at the Station, from Hon. William R. Sessions, secretary of the Board of Agriculture, with the request for information as to what they were and the best methods of destroying them. These caterpillars were brought into the secretary's office by Mr. John Stetson of Medford, Mass., who stated that they were very destructive in that town, eating the leaves of fruit and shade trees. Mrs. Fernald, who had charge of the entomological work during my absence, determined the insect to be the gypsy moth (*Ocneria dispar* Linn.) of Europe, but as the moths were emerging and laying their eggs for next year's brood, there was nothing to recommend at that time except to destroy the moths and their eggs as far as possible, and prepare for the destruction of the caterpillars when they first appear next spring.

First Importation into America.

“There is a statement in the second volume of the American Entomologist, page 111, published in 1870, and also in Riley's Second Missouri Report on Insects, page 10, that only a year ago the larva of a certain owl moth (*Hypogymna dispar*), which is a great pest in Europe both to fruit

trees and forest trees, was accidentally introduced by a Massachusetts entomologist into New England.'

“These are the only notices I have thus far been able to find of the introduction of this insect into America. Mr. Samuel Henshaw and Dr. Hagen of Cambridge have both informed me that the entomologist who introduced this insect was Mr. L. Trouvelot, now living in Paris, but at that time living near Glenwood, Medford, where he attempted some experiments in raising silk from our native silk worms, and also introduced European species for the same purpose. Dr. Hagen told me that he distinctly remembered hearing Mr. Trouvelot tell how they escaped from him after he had imported them.

“It seems, then, that this was an accidental introduction, but that they have now become acclimated, and are spreading and doing so much damage as to cause very great alarm.

Distribution.

“The gypsy moth is abundant in nearly all parts of Europe, northern and western Asia, and it even extends as far as Japan. (In this country it has been found only in nineteen cities and towns of Massachusetts. The whole of Medford, Malden and Everett and sections of Arlington, Melrose, Somerville, Cambridge and Chelsea are thoroughly infested, while in Stoneham, Winchester, Belmont, Saugus, Revere, Lynn, Lexington, Swampscott, Wakefield, Burlington and Charlestown they have been found more or less prevalent.)

Food Plants.

(It has been ascertained by experiment at the office of the Gypsy Moth Department in Malden, Mass., that they will feed on the following-named trees and plants: maple, elm, willow, horse chestnut, balm of gilead, birch, ash, sycamore, walnut, oak, basswood, witch hazel, pine, spruce, cedar, hemlock, apple, peach, cherry, pear, quince, blackberry, currant, barberry, grape, whortleberry, blueberry, strawberry, hop, cabbage, beet, lettuce, radish, corn, dandelion, woodbine, tulip, hawthorn, azalea, rhododendron, wistaria, hollyhock, wygelia, syringa, rose and Japan quince.)

Danger of Spreading.

“The fact that this insect has now been in this country for the last twenty years, and has not only held its own but has multiplied to such an extent as to cause the entire destruction of the fruit crop and also to defoliate the shade trees in the infested region, is sufficient cause for alarm. The citizens of Medford are immediately interested, but the entire Commonwealth and country are threatened with one of the worst insect pests of all Europe. In 1817 the cork-oaks of southern France suffered severely from the attacks of this insect. One of the papers of that time stated that the beautiful cork-oaks which extended from Barbaste to the city of Podenas were nearly destroyed by the caterpillars of the gypsy moth. After having devoured the leaves and young acorns they attacked the fields of corn and millet, and also the grass lands and fruit trees.

“In 1878 the plane trees of the public promenades of Lyons were nearly ruined by this same insect. Only last summer (1889) I saw the moths in immense numbers on the trees in the zoölogical gardens of Berlin, where the caterpillars had done great injury; and the European works on entomology abound with instances of the destructiveness of this insect. When we consider its long list of food plants, we can see how injurious this insect may become if allowed to spread over the country and become established.

“The opinion was expressed to me by prominent entomologists in Europe, that if the gypsy moth should get a foothold in this country it would become a far greater pest than the Colorado potato beetle, because it is so prolific, and feeds on so many different plants, while the potato beetle confines itself to a small number.

Description of the Insect.

“The males (Fig. 1) are of a yellowish brown color, with two dark brown lines crossing the forewings, one at the basal third, the other on the outer third, somewhat curved, and with teeth pointing outwards on the veins. The outer end of all the wings is dark brown. A curved dark brown spot (*reniform*) rests a little above the middle of the wing, and a

small round spot of the same color (*orbicular*) is situated between this and the base of the wing, just outside of the inner cross-line. A similar spot rests near the middle of the base of the wing. The fringes on the forewings are dull yellowish, and broken by eight brown spots. The antennæ



FIG. 1.

are strongly bipectinated, or feather-like. The forewings expand about an inch and a half.

“The females (Fig. 2) are pale yellowish white, with dark brown cross-lines and spots similar to those of the males. The cross-lines in both sexes are much darker and more prominent on the forward edge of the wings (*costa*) than elsewhere. In some specimens there is a faint stripe of brown across the middle of the wing (*median shade*), and a toothed line across the wing near the outer edge (*subterminal*

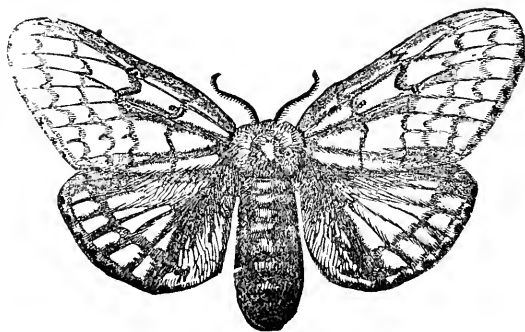


FIG. 2.

line). The fringes of the forewings have eight dark spots between the ends of the veins, as in the males, and similar but fainter spots often occur in the fringes of the hind wings. The body is much stouter than in the males, and the antennæ are not so heavily feathered. The expanse of wings is from one and three-fourths to two and three-fourths inches.

“ The eggs are globular, about one-eighteenth of an inch in diameter, nearly salmon colored and with a smooth surface. They are laid on the under side of the branches, on the trunks of the trees, often below the surface of the ground, where the latter has shrunk away from the tree, and not infrequently on the fences or on the sides of buildings. They are laid in oval or rounded masses, often to the number of four hundred or five hundred, and covered with ochre yellow hairs from the abdomen of the female. The eggs are laid in the early part of July, but do not hatch till the following spring. The caterpillars remain together, feeding upon the leaves, and when not feeding they habitually rest side by side on the branches and trunks of the trees.

“ The full-grown caterpillar (Fig. 3) is about an inch and three-fourths in length, very dark brown or black, finely

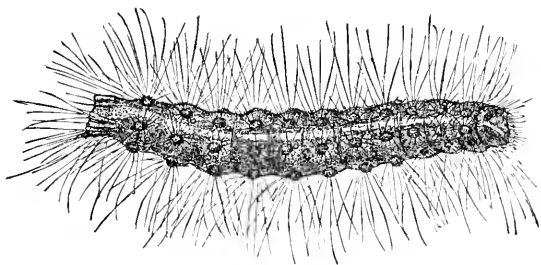


FIG. 3.

reticulated with pale yellow. There is a pale yellow line along the middle of the back and a similar one along each side. On the first six segments following the head there is a bluish tubercle armed with several black spines on each side of the dorsal line, and on the remaining segments these tubercles are dark crimson red. In the middle of the tenth and eleventh segments there is a smaller red tubercle notched at the top. The whole surface of the body is somewhat hairy, but along each side the hairs are long and form quite dense clusters.

“ The pupa (Fig. 4) is from three-fourths of an inch to an inch in length, and varies in color from chocolate to reddish brown. On each side, at the base of the wing-covers, is a dark reddish brown, oval, velvety spot. The wing-cases are quite broad and reach to the posterior third of the fifth seg-

ment. The antennae cases are strongly curved, and are quite wide in the middle. There are a few yellowish brown hairs on the face and head, also on the first five segments, arranged in broken circles or clusters, which are in longitudinal and transverse rows. The *cremaster* or spine at the

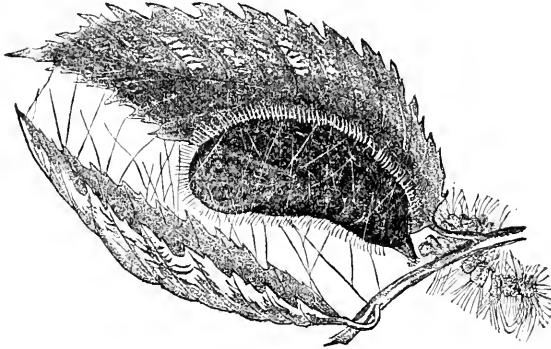


FIG. 4.

posterior end is flattened, rounded at the outer end, grooved longitudinally, and has twelve or more minute hooks at the end. The moths emerge from the pupæ from the first to the middle of July."

The foregoing was prepared by Professor Fernald from knowledge acquired largely from European sources. Observation in this country shows some slight variation in dates of transformation, size of insect in the various stages, etc.

Outline of Work of Extermination.

The Legislature of 1890, on petition of the Board of Agriculture and citizens of Medford and vicinity, provided, by an act approved March 14, for the appointment of a commission to take the matter of extermination in charge, and appropriated \$25,000 for the purpose. The Governor appointed as commissioners: W. W. Rawson of Arlington, J. Howard Bradley of Malden and Dr. Pearl Martin of Medford. The commission took hold of the work promptly but found the task greater than was supposed and that the appropriation would be insufficient, and consequently applied to the Legislature for an additional appropriation of \$25,000.

which was granted by an act approved April 2. The commission employed more than one hundred men during the season for work, spraying a large territory with Paris green and killing an immense number of caterpillars. They also destroyed an incredible number of the eggs of the moth both in the spring of 1890 before the caterpillars emerged and in the fall after the eggs for the next year's crop were laid. The amount expended in 1890 was \$25,539.32. On March 4, 1891, Wm. R. Sessions of Hampden, Prof. N. S. Shaler of Cambridge and F. H. Appleton of Lynnfield were appointed commissioners and immediately organized a force for work, engaging E. H. Forbush of Worcester as director of field work. The first work was an attempt to locate the entire territory infested. This was done by parties of young men who searched the country for miles around Medford, using powerful opera-glasses to aid in discovering the nests of eggs. Only reliable men could be of use, and the commissioners and director found it almost impossible to secure the requisite number. A squad of ten or more from the Agricultural College have been exceedingly helpful, and most of them have been made superintendents of work. By an act approved April 17 the Legislature transferred the work to the Board of Agriculture, and the Board, at a special meeting April 28, appointed Wm. R. Sessions, N. S. Shaler and F. H. Appleton a committee to act for the Board. It was found that the residue of last year's appropriation would be insufficient to carry on the work for the season, and the Board petitioned the Legislature for an additional appropriation of \$50,000, which was granted by an act approved June 10. The work of extermination is now going on, and about 250 men are employed. The work at this season is spraying the trees and shrubbery throughout the infested territory with Paris green and water, one pound of Paris green to 150 gallons of water. The country in all directions is patrolled by expert scouts on the lookout for stray colonies of the creatures, that new centres of infection may not be established. Prof. C. H. Fernald, entomologist to the Board of Agriculture and professor of zoölogy at the Agricultural College, is the adviser of the committee in all parts of the work. The task is almost herculean but it is

believed it is possible to eradicate the pest. The utmost efforts for this end are being put forth by those having the work in charge.

On a recent visit of inspection by Dr. Fernald his attention was called to the eggs which a native parasite was laying upon the bodies of the caterpillars. In his report to the committee June 26, 1891, he says: "What seems to me to be by far the most important result of our inspection was the discovery of parasites on the caterpillars. In one locality in Arlington, where we found the caterpillars numerous, we discovered the eggs of a dipterous insect, probably a *Tachina*, on many of them, the majority having a single white egg on the back, while some had two or three, or more, and on one there were eight eggs. I collected a large number of these infested caterpillars and requested Mr. Forbush to have them properly cared for at the office. If these eggs hatch and the parasites pass their transformations and destroy the caterpillars of the gypsy moth, we shall have an acclimated parasite of greater value than any foreign species could be, and shall avoid the delicate and expensive operation of importing parasites from Europe."

MASSACHUSETTS
CROP REPORT

FOR THE

MONTH OF JULY, 1891.

COMPILED BY

WM. R. SESSIONS,
SECRETARY STATE BOARD OF AGRICULTURE.

BOSTON :

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1891.

CROP REPORT FOR THE MONTH OF JULY, 1891.

COMPILED FROM RETURNS TO THE OFFICE OF THE STATE BOARD OF
AGRICULTURE, JULY 28, 1891.

OFFICE STATE BOARD OF AGRICULTURE,
BOSTON, MASS., Aug. 4, 1891.

Bulletin No. 3, Crop Report for the month of July, is herewith presented. These crop bulletins are compiled from data received from selected correspondents in different parts of the State, by means of blanks sent to them monthly. For this issue one hundred and sixty such blanks were sent out, and one hundred and twenty-six were returned in time to be incorporated in the bulletin.

The weather data, from observers in several localities in the Commonwealth, are received and compiled by an expert in such matters.

These crop bulletins will be mailed as issued to those who have received them in past seasons, and to any others who may make application for them. Since the last issue the list of those to whom the bulletins are sent has been revised and arranged alphabetically. If any do not receive the bulletins regularly they will confer a favor upon this office by reporting the same, to the end that they may be supplied. It is believed that this kind of work is of value to those engaged in agricultural pursuits, and every effort will be made to make it as valuable as possible.

In the circular to correspondents returnable to this office July 28, the first question asked was: "Has the hay crop been secured, and state quantity and quality as compared with an average season?" Most of the correspondents report that the hay crop has been entirely secured, while others state that another week of fair weather will be required. The crop throughout the State is about three-

fourths of an average in quantity. While some of it was injured by rain in gathering, the quality as a whole is good, and a number report it to be excellent. It will be observed that haying has been greatly delayed this season.

The second question asked was: "What is the outlook for rowen?" The prospect now is that rowen will not be an average crop in quantity, owing to lack of rain and the late cutting of much of the first crop. While some report that the prospect for a full crop is very good, the majority state that the outlook is not encouraging at the present time.

The third question asked was: "What is the prospect for a crop of apples, fall and winter?" The general opinion seems to be that the crop of fall apples will be from fair to good, while the crop of winter varieties will be considerably below the average. There appear to be very few Baldwins. Apple trees blossomed full and considerable fruit set; but many apples have dropped off. The quality of those left on the trees is reported as generally good. No doubt this is due, in some instances at least, to the practice of spraying the trees to destroy the codling moth.

The fourth question asked was: "How are small fruits yielding, and state prices received as compared with an average season?" On the whole, the yield of small fruits has been slightly below the average, while prices have been at least average and probably slightly above. Considerable variation is noticed in the reports of correspondents. The quality of small fruits has generally been good.

The fifth question asked was: "How have early potatoes yielded, and state average price received per bushel?" Early potatoes have been generally harvested, although a few correspondents report that digging has not yet commenced. Most report a good yield, although a few cases of light yield are reported. The crop is generally of very good quality. Only two or three correspondents report blight or rot. Several report that the vines looked thrifty, but few potatoes were found in the hills, owing doubtless to the dry weather at time of setting. Prices have ranged from \$2 down to 50 cents per bushel. Probably \$1 per bushel would be a fair average. The price per bushel now will average not far from 75 cents.

The sixth question asked was : " What has been the yield and quantity of rye, oats and barley ? " Rye has been generally satisfactory both in respect to quality and quantity. Many pieces of oats and barley have been cut green to supplement the hay crop and prove very useful for that purpose. Those fields still standing are reported as looking unusually well.

Pastures have been injured by lack of rain, and the quantity of milk considerably lessened. The peach crop promises to be much larger than usual. Cranberries promise well now. The pear crop is good. Some fields of tobacco have been topped, and the crop promises to be an unusually good one. Indian corn is looking well, but is still backward and needs warmer weather. On the whole the condition August 1 is favorable and the season so far has been fairly prosperous for the farmer.

Report No. 86 of the Statistician of the United States Department of Agriculture gives the following figures of estimated acreage and condition of crops in Massachusetts July 1, 1891 : Acreage of corn compared with last year, 107 ; average condition July 1, 93 ; average condition of rye July 1, 97 ; average condition of oats July 1, 95 ; average condition of barley July 1, 94 ; acreage of potatoes compared with last year, 105 ; average condition July 1, 97 ; acreage of beans compared with last year, 103 ; average condition July 1, 98 ; acreage of tobacco compared with last year, 102 ; average condition July 1, 98 ; average condition of clover July 1, 88 ; average condition of timothy July 1, 84 ; average condition of pasture July 1, 89 ; average condition of apples July 1, 71 ; average condition of peaches July 1, 67 ; average condition of grapes July 1, 97 ; average weight per fleece, 4.8 pounds.

An article showing the yield and value per acre of crops in Massachusetts, as compared with other States, will be found printed at the end of the bulletin.

The " Notes of Correspondents," following the weather data for the month, give much that will be of interest to agriculturists. It will be observed that the notes are arranged by counties, commencing with Berkshire and working eastward to Nantucket. It will also be observed that

the towns in the counties are arranged in a connected manner. It is believed that these changes in the "Notes of Correspondents" will give the reader a more accurate idea of the true condition than was possible under the former system of arranging the counties alphabetically and the towns in the counties in the same way.

It is thought that these bulletins will be made more useful and interesting by including each month abstracts from the weekly Weather-Crop Bulletins issued by the United States Department of Agriculture. Accordingly such abstracts for the month of July are here inserted:—

TEMPERATURE AND RAINFALL FOR THE WHOLE COUNTRY.

FROM UNITED STATES WEATHER-CROP BULLETINS.

Week ending July 3.—Excess of temperature in the Gulf and Pacific States; deficiency elsewhere. General deficiency in rainfall.

Week ending July 10.—General deficiency of temperature. General excess in rainfall.

Week ending July 17.—Excess of temperature in New England and Pacific coast; deficiency elsewhere. Areas of excessive rainfalls during the past week much broken and widely distributed, the largest area extending from Lake Superior westward to Oregon.

Week ending July 24.—General deficiency of temperature. Excess in rainfall on the Atlantic coast; deficiency elsewhere.

Week ending July 31.—Deficiency in temperature in all but Gulf and Pacific States. The month of July has been cooler than usual in all districts east of the Rocky Mountains. There has been more rain than usual for the week generally along the Atlantic coast, in the interior of the Southern States and at Rocky Mountain stations.

CONDITION OF CROPS IN THIS SECTION.

FROM UNITED STATES WEATHER-CROP BULLETINS.

Week ending July 3.—New England: "Very favorable week, except too cold for corn. Grain stands above average. Potatoes injured by drought. Apples dropping considerably. Wild fruits abundant."

Week ending July 10. — Massachusetts: "Favorable week for crops, except too cold for tobacco and corn; very unfavorable weather for haying and little done during the week."

Week ending July 17. — Massachusetts: "Very favorable week for growth of crops and for harvesting hay and grain, the latter in excellent condition; rain needed."

Week ending July 24. — New England: "Favorable growing and harvesting weather; rye mostly harvested and yield excellent; potatoes yielding below the average; apple crop light, except in Connecticut; peaches and pears abundant."

Week ending July 31. — New England: "Hay and grain harvest has been delayed by unfavorable weather; grain somewhat injured by heavy rains and high winds. Warmer weather is needed, though all crops are making rapid growth."

MASSACHUSETTS WEATHER.

Meteorological Data for July, 1891.

STATION.	TEMPERATURE. DEG. F.					PRECIPITATION.		Prevailing Wind.	CLOUDINESS. * (0 to 10.) No. of Days.		
	Mean.	Maximum.	Date.	Minimum.	Date.	Total in Inches.	Days with Precipitation.		Cloudy.	Partly Cloudy.	Cloudless.
Springfield, .	69.6	90	13, 14	50	28	6.37	12	S.	12	13	6
Amherst, .	65.9	89	13	42	28	5.09	10	S.	13	11	7
Royalston, .	68.6	96	14	50	28	5.12	9	S. W.	18	9	4
Fitchburg, †	67.6	87	13	50	31	3.95	10	W.	8	9	14
Dudley, .	69.4	89	12, 13	54	31	2.09	8	S. W.	14	7	10
Framingham,	67.4	89	13	46	28	3.07	10	—	—	—	—
Concord, .	67.1	90	13	45	28	2.97	11	S. W.	12	6	13
Lawrence, .	70.9	100	13	49	28	3.20	9	W.	12	5	14
Ipswich, .	68.8	91	13	54	28	2.68	9	S. W.	8	17	6
Boston, .	69.0	90	13	56	28	3.73	10	S. W.	9	12	10
Taunton, .	68.0	90	13, 17	44	28	2.17	10	S. W.	9	10	12
Middleboro',	65.7	87	13	41	28	2.19	8	S. W.	10	11	10
Nantucket, .	64.8	78	17	48	2	3.16	9	S. W.	10	9	12

* 0 to 3, cloudless; 4 to 7 inclusive, partly cloudy; 8 to 10, cloudy.

† Temperature data from thermometer not self-registering.

Summary.

Temperature (F.).—Monthly mean, 67.9° . Highest monthly mean, 70.9° at Lawrence; lowest monthly mean, 64.8° at Nantucket; maximum, 100° at Lawrence on the 13th; minimum, 41° at Middleborough on the 28th; range, 59° ; greatest local monthly range, 51° at Lawrence; least local monthly range, 30° at Nantucket; greatest daily range, 39° at Lawrence on the 17th; least daily range, 4° at Ipswich on the 30th. Average temperature for July at Springfield for twenty-four years, 73.2° ; average for July, 1891, 69.6° ; departure, -3.6° . Average temperature for July at Boston for twenty-one years, 71.0° ; average for July, 1891, 69.0° ; departure, -2.0° .

Precipitation.—Average, 3.52 inches; greatest, 6.37 at Springfield; least, 2.09 at Dudley. Average for July at Springfield for forty-four years, 4.50; for July, 1891, 6.37; departure, $+1.87$. Average for July at Boston for twenty-one years, 3.58; for July, 1891, 3.73; departure, $+0.15$.

Prevailing Wind.—South-west.

Thunder-storms.—2d, 4th, 15th, 20th, 24th, 25th.

Solar Halos.—7th, 9th, 12th, 13th, 17th, 20th, 22d, 24th.

Lunar Halos.—24th.

REMARKS.

The weather for the month of July, 1891, for Massachusetts, as compared with the month in other years, may be characterized as cool and wet, with an excess of cloudy and rainy days. Both the maximum and minimum temperatures were somewhat below the figures generally recorded, the latter unusually so. On the morning of the 28th, when a large anticyclone or high barometer area lay off the middle Atlantic coast, the thermal mercury ran down to within less than ten degrees of the freezing point of water, but no frost has yet been reported. Low temperatures also occurred on the 10th and 11th and on the 31st. At Springfield, the mean for the month (69.6°) was the lowest July mean ever recorded during a period of twenty-nine years, covering

from 1851-55 and from 1868-91. The next lowest mean was 69.8° in 1884. The highest July mean at that station was 77.6° in 1876. At Fitchburg, where there is a series of observations beginning in 1857, the years 1860, 1865 and 1884 only show a July mean lower than the present, the lowest being 66.6° in 1860, just one degree lower than in 1891. The highest mean at that station was 74.4° in 1870. The records at the Weather Service office in Boston show lower July means in 1881, 1884 and 1888, the lowest being in 1884 and also just one degree lower than in 1891. The warmest July at Boston, in the twenty-one years of observations, was in 1872, when the mean for the month was 74.7° . At Thompson, Conn., where observations for nearly half a century have been made, and with a thermometer that has hung in nearly the same position during all that time, the mean was the lowest, with one exception, ever recorded. That was in 1859, when the mean was 64.9° , less than one-half degree lower than in 1891.

The precipitation was generally heaviest and the number of rainy days greatest in the Connecticut valley, while the least precipitation fell over that section between the Connecticut valley and the coast region. Thunder-storms were not frequent or unusually severe. Hail fell at Cheshire on the 20th, during the progress of a thunder-storm, doing some damage to tobacco. At Springfield, on the 25th, during a heavy thunder-storm 0.85 inches of rain fell in fifteen minutes. It was accompanied by high winds along the south-central part of the State. At Dudley, there were three distinct thunder-storms during the afternoon of that date. The sea breeze was frequent and well marked along the coast.

NOTES OF CORRESPONDENTS.

(Mailed to us July 28.)

BERKSHIRE COUNTY.

Sandisfield (GEO. A. SHEPARD). — Hay crop not all secured; about three-fourths of an average crop; quality excellent, far better than last year. Outlook not favorable for rowen. There is prospect of an average crop of both fall and winter apples, though they have dropped considerably. Small fruits are and will be quite plenty. Medium yield of early potatoes; only a few offered as yet; about \$1 per bushel. Potatoes are struck with blight in some fields. Oats are a full average crop.

Egremont (J. H. ROWLEY). — Hay crop about one-half secured; quantity two-thirds; quality good. Poor outlook for rowen on account of drought. Prospect of a light crop of apples. Small fruits about an average in yield and prices. On account of dry weather but few early potatoes have been dug. Rye threshing has not commenced.

Dalton (W. B. BARTON). — The hay crop has turned out better than was expected, but on account of catching weather only about half has been secured. Should call it an average crop. Outlook for rowen very good. Ensilage and field corn look well. The outlook is fair for a crop of apples, fall and winter. Small fruits an average yield, with prices a full average. Yield of early potatoes not large; \$1 per bushel. Rye and oats good. While there has been no flush feed in pastures they are holding out well.

Cheshire (L. J. NORMAN). — Most of the hay crop in this section has been secured; quantity not over two-thirds; average in quality. The outlook for rowen is quite promising. The prospect for apples, both fall and winter, is very good. Small fruits are yielding finely and good average prices are maintained. Early potatoes have yielded well; average price per bushel about \$1. Rye, oats and barley never looked better; don't know about the yield, but it promises to be large.

Hancock (C. H. WELLS). — A few farmers have finished haying, getting about three-fourths of a crop; quality good. Rowen is

starting well. Prospect of a fair crop of fall and winter apples. Potatoes are looking finely, but none marketed yet. No rye of any amount raised. Oats and barley look well but none cut yet.

Williamstown (S. A. HICKOX). — It will take about another week to secure the hay crop, which is a good average in quantity and of fine quality. Rowen promises well. Prospect good for a crop of apples. Early potatoes are yielding well; average price to date about \$2.50 per barrel. Rye promises fair. Oats and barley must be good average crops.

FRANKLIN COUNTY.

Monroe (D. H. SHERMAN). — Hay mostly secured, and from two-thirds to three-fourths of an average crop; quality of what has been secured without being wet is good. Fair outlook for rowen. Very fair prospect for a crop of apples. But very few small fruits except berries, which are abundant. But few early potatoes dug yet; yield fair. Oats look well.

Charlemont (H. S. GILES). — The hay crop is mostly secured. Some of it has been damaged by bad weather. The crop is not as large as last year, but is more valuable for feeding. Outlook for rowen good if the weather is favorable. Yield of small fruits not quite an average; prices about the same as last year. Yield of early potatoes is very good; average price about \$1 per bushel. Yield of oats, rye and barley a full average and quality very good. Corn is looking well, but is late. The apple crop is a partial failure in the valleys, as are also quinces and pears. There will be a good showing of grapes.

Buckland (J. D. AVERY). — The hay crop is all secured in excellent condition. In quantity it is ten per cent below the average, but in quality is No. 1. Outlook is fair for rowen, but some pieces have suffered for want of rain. Think the apple crop will be one-fourth short. Early potatoes have yielded fairly well; price lower than usual. Yield and quality of rye very good indeed. Nearly or quite all the oats and barley are cut green for fodder. Corn is looking remarkably well; the ground is well stocked and the growth is very good.

Bernardston (R. H. CUSHMAN). — Hay crop is nearly secured, with about three-fourths the quantity of last season. We believe the quality of the hay will enable us to winter very nearly as much stock as last winter. Rowen is looking very well. Apples are not plenty, but what we have are fair and promise well. Early potatoes are plenty, and have sold for \$1.25 down to 50 cents per bushel.

Deerfield (CHARLES JONES). — Hay has been nearly all harvested, and is about three-fourths of a crop, and of good quality. Rowen is looking well. Very few apples, either fall or winter. Early potatoes are yielding well; average price about 85 cents per bushel. Rye is good; more than an average. Oats look well, but are not harvested. Tobacco is looking extremely well, and some has been topped. Onions are looking very well, but are not full stocked. We have had a fair amount of rain in July, with some very warm weather. All crops are looking well now.

Orange (ANSEL HARRINGTON). — Hay crop mostly secured, and the quality and quantity are excellent. Quantity about one-eighth above an average season. Not a very good outlook for rowen. Yield of small fruits very good; prices about the same as in former years. Yield of early potatoes very good; prices variable. Potatoes never looked better. Very little grain raised in this vicinity, except oats, which are cut green for fodder, and this year the yield and quality are excellent. Corn is looking finely, but is a little backward. Farm crops, as a whole, are very promising. Slight frost on morning of the 28th.

HAMPSHIRE COUNTY.

Greenwich (WM. S. DOUGLAS). — Hay crop secured and quantity about one-half an average, with quality about an average. The outlook for rowen is quite favorable. The late frosts injured apples, and there is prospect of less than half a crop. Early potatoes are yielding fairly well and are much cheaper than in some seasons. Grains are fairly good.

Belchertown (H. C. WEST). — Hay mostly secured. Old pieces and early cut are light, but newly seeded and later cut pieces three-fourths of a crop. As yet the outlook for rowen is not encouraging. The prospect is for a fair crop of apples. Early potatoes are yielding above the average; prices commenced with \$2, now \$1 per bushel. Rye good. Oats not harvested and are looking well. Very little barley raised, though there are some good pieces in town. I wonder that more barley is not raised as it is one of our best paying sowed crops. Corn is growing finely.

Hadley (L. W. WEST). — Hay crop secured, and is ninety per cent of an average season in quantity and of good quality. Outlook for rowen poor unless it rains soon. Apple crop will not be up to the average. Early potato vines look well, but few potatoes in a hill; price not established. Yield and quality of rye good. Oats not harvested. Three and three one-hundredths inches of rain have fallen since last report.

South Hadley (H. W. GAYLORD).—Those that are finishing their haying find that they are cutting more grass than they expected. Some pieces have doubled in quantity since the first of the month. The outlook for the rowen crop is discouraging. While we have had frequent rains of late they have been light, not wetting down as low as it dried last May. The light yield of potatoes is attributed to this fact. Prospect for summer and fall apples is fair; for winter one-half a crop. Strawberries two-thirds of a crop; other berries fair crop; prices above the average. Early potatoes not yielding up to expectations. Large tops, but few potatoes in the hill. Prices from \$1.75 to 75 cents per bushel. Corn is very backward; more than two weeks.

Southampton (C. B. LYMAN).—The hay crop is about the average of former years, with the exception of the past two seasons, when the crop was above the average. The outlook is for a light crop of rowen. Corn and potatoes are looking well. Tobacco never looked better. Pears are abundant. Apples about the average for odd years. Peaches are beginning to ripen, and there will be a full crop. Early potatoes are yielding fairly well; average price about 95 cents per bushel. Oats are heavy. Up to the 1st of August I think the prospect looks quite bright for the farmer.

Chesterfield (HORATIO BISBEE).—The hay crop matured late, and those cutting early got a light crop. July has added much to the crop in this vicinity, and it is nearly an average and of excellent quality. Fair outlook for rowen. Apples will not be very plenty. Yield of early potatoes light and not many sold. They are showing signs of blight.

HAMPDEN COUNTY.

Blandford (E. W. BOISE).—About three-fourths of the hay crop is secured, and is of full average quantity and quality. Fair to average outlook for rowen. Some report apples falling off prematurely; others report trees well filled. No early potatoes harvested yet. The growth of tops is large, and there is prospect of a fair yield. Oats and barley, especially barley, extra stand, heavy headed, no rust. On the whole, the present season thus far has been favorable to the farmer. Stock in pastures are doing well, dairy stock especially.

Agawam (R. DE WITT).—Hay crop nearly all secured, and nearly up to an average. The last weeks have helped it. Outlook very favorable for rowen. The crop of apples must be small. Potatoes with us were some two weeks later than usual, and our

markets were filled from more southern points, so we failed to realize the prices we usually get in the beginning of the season; 60 cents per bushel now. Rye, I think, is excellent. Oats are not harvested yet. Barley looks all right, though not much of it is raised here.

West Springfield (J. N. BAGG). — Hay crop largely secured, and is about one-third less than an average; quality good. Very poor outlook for rowen, but late rains may change it. The prospect is for a light crop of both fall and winter apples. Good yield of early potatoes; selling now for about 75 cents per bushel; average price about \$1. Rye and oats above the average. Heavy shower July 25, with strong wind. Corn and tobacco suffered by being blown down or broken. Weeds are rampant among corn and potatoes here, and farmers are still hoeing.

Chicopee (R. W. BEMIS). — Hay crop nearly all secured, and is about two-thirds of a crop. Outlook for rowen very good at this time. Apples will not be a large crop in this vicinity. Small fruits fair in yield and prices about average. Early potatoes are not as forward as usual, but promise a good crop. Grains are fair.

Wilbraham (F. E. CLARK). — Hay crop secured. Newly seeded land has yielded nearly an average crop; but old mowings have not yielded more than one-half of an average crop. Outlook fair for rowen, especially on newly seeded pieces with clover. Early and fall apples are plenty; winter apples about two-thirds of a crop. Berries plenty; prices about an average. Early potatoes about three-fourths of an average crop; average price \$1 per bushel; now 75 cents. Rye hardly an average yield. Oats considerably more than an average yield.

Brimfield (S. W. BROWN). — Hay crop less than an average, and about two-thirds of last year; quality good. Rowen is backward but the crop will be fair. Apples small; about a failure. Good yield of early potatoes; so far sold for from 80 cents to \$1 per bushel. Rye average crop. Oats best crop for years; one-third more than last year. No barley to speak of. Most of the oats are cut for fodder, which will help fill up the partly empty barns caused by the shortness of the hay crop. Pastures, like mowings, have been short all summer. Hungarian looks well. With some hot weather corn would soon beat the average.

WORCESTER COUNTY.

New Braintree (C. D. SAGE). — Hay is turning out much better than was expected a month ago, and the quality is good, except where injured by the spittle insect. Outlook for rowen fair where the first crop was cut early. Apples set quite full, but have

dropped off so that there will hardly be half a crop. But few early potatoes dug yet; are looking well; price about \$1.25 per bushel. Oats are looking finely. Rye was a good crop. Barley looks well, but less than usual grown.

Barre (J. L. SMITH). — Hay crop nearly all secured; two-thirds of a crop of very good quality, and secured without very much damage. Fair crop of rowen expected. There is prospect of more apples than last year, but not a large crop. Not many early potatoes dug yet. They are looking finely, and are worth \$1 per bushel. Oats and barley are extra good. Not much rye raised.

Templeton (LUCIEN GOVE). — Haying not quite done and crop thirty per cent less than last year, but of good quality. Outlook for rowen is fair. Prospect of not more than one-third of a crop of apples. Raspberries, blueberries and blackberries average crops and prices rather better. Early potatoes yielding fairly well; price \$1.20 per bushel. Oats and barley raised for fodder and have yielded well. Crop of rye rather light and but little raised. Corn is backward. Pastures are rather short and the flow of milk diminished. The month, as a whole, has been rather cool and is closing cold for the season. There has been sufficient rain to keep crops growing.

Leominster (W. B. HOSMER). — Hay crop secured, with quantity about three-fourths of an average crop, but quality much better, making it equal to a full crop. Outlook for rowen good, especially on early cut fields. Yield of small fruits below average; prices average. Yield of early potatoes rather below average; price \$1 per bushel. The late rains leave the ground in good condition and, excepting the cool nights, favorable for most crops. More apples than last year, and where Baldwins are bearing look large and fine and free from blight. Perhaps spraying the trees may have caused the better appearance.

Harvard (PRESTON KNIGHT). — Hay has nearly all been secured, with quantity about three-fourths of an average crop. On some farms there is scarcely any rowen; on others it is fair. Prospect poor for a crop of apples. Small fruits yielding very well, and I believe prices are generally satisfactory. Early potatoes are small and not ripe, but many are digging; prices \$1.60 to \$1 so far. Rye and oats are raised for fodder, and such pieces are very good. Barley not ripe yet. Dog-days came in with a driving thunderstorm, knocking down some corn and oats, but also doing great good to the very dry ground. The past month has been generally pretty dry.

Boylston (I. A. DUNN). — Hay crop nearly all secured; quantity below and quality above the average. Outlook for rowen is

good at the present time. Crop of fall apples promises to be fairly good. Baldwin apple trees failed to blossom. Good average yield of small fruits; prices as usual. Yield of early potatoes good, and price \$1 per bushel. Indian corn is looking well, but backward. The weather the last two weeks has been favorable for the growth of crops, and they have advanced rapidly.

Worcester (S. A. BURGESS). — Hay crop nearly secured and is about two-thirds of an average crop in quantity, and of average quality. Fair outlook for rowen. Prospect of a small crop of apples, especially of winter apples. Small fruits quite abundant with prices about an average. Early potatoes yielding fairly well with about the average price. Rye, oats and barley are used mostly as forage and hay. Wheat has proved an excellent forage crop for milch cows. Late potatoes are looking very well. Field corn is looking well and if frost holds off until the middle of September will prove a good crop. An unusually large acreage of corn for fall fodder has been planted and now looks well.

Dudley (J. J. GILLES). — Hay crop in quantity three-fourths of an average season; quality average. The prospect is that rowen will be a light crop. Prospect of one-half of an average crop of apples. Early potatoes yielded well; price from \$1 to \$1.50 per bushel. Rye straw is yielding above an average. Oats are free from rust, and a fine crop both in straw and berry. Barley is not much raised in town.

Douglas (GEO. M. WALLIS). — Hay all secured, and quantity three-fourths of an average and quality one-fourth better than last season. The prospect is good for rowen if it holds wet. Apples about twenty-five per cent of a crop. Small fruits very fair, with prices about the same as last season. Good crop of early potatoes; average price \$1 per bushel. Corn, potatoes, oats, rye, barley and buckwheat on an average are one hundred per cent. Grape vines are loaded with fruit, and the finest I ever saw them. No potato rot or scab has been discovered yet. All kinds of garden vegetables promise to be first class.

Blackstone (L. R. DANIELS). — About seven-eighths of the English hay crop secured; three-fourths of an average crop of good quality. Not a very promising outlook for rowen. Prospect of about one-third of a full crop of apples. Small fruits are yielding well; prices about as usual. Red raspberries one-half price. Early potatoes yielding very well, with average price to date about 90 cents per bushel. Very little grain grown here except for feeding green.

MIDDLESEX COUNTY.

Sherborn (N. B. DOUGLAS). — English hay secured; crop sixty per cent; quality A No. 1. Meadow hay of average quantity and of good quality. Outlook poor for rowen. Prospect for a small crop of apples; size large. Yield of small fruits good, except strawberries, and prices above the average. Fair yield of early potatoes, but the price has declined so rapidly that it is difficult to fix the average; should say, to date, about \$1.10 per bushel. Little grain raised, except for stover. Rye and oats good. Very little barley raised until late, for green feed. Much seeding will be done this fall. Corn, though rather late, shows good color and looks thrifty. Pastures rather short. The season has been better for the farmer than the preceding three.

Framingham (H. S. WHITEMORE). — Hay crop mostly secured; two-thirds in quantity; quality good. Outlook very poor for rowen unless we get rain. Prospect very poor for both fall and winter apples. Berries are plenty. Cherries in abundance. Prices low. Good yield of early potatoes; average price about 90 cents per bushel. Rye is an average crop.

Concord (W. H. HUNT). — The hay crop has been secured in good condition. The quality is not quite up to last year. In old fields wild grasses have worked in. Rowen promises to be better than last year. Fair crop of fall apples; few winter apples. Strawberry crop three-fourths of a full crop; price 10 to 20 cents a box. The average price of strawberries would be hard to determine. Some large berries have been sold for 30 cents a box, and small poor ones for 10 cents. The average price for the year is above that of the last few years. Potato crop a good one, and price low for this time of year.

Billerica (J. N. PARDEE). — Hay about all in; two-thirds of a crop; quality excellent. Rowen not growing, except in the shade; ground very dry and hard. Apple crop very light; quality good. Yield of small fruits good. Yield of early potatoes large; no potato rot as yet. Earliest dug brought 40 cents per peck; now 80 cents per bushel. Not much grain raised except for forage, but yield of that has been good and quality excellent.

Westford (ARTHUR WRIGHT). — The hay crop has been secured, and should say it is one-eighth less than last year; quality excellent. Outlook for rowen better than last year. Fall apples fair; winter crop very short, hardly any Baldwins. The crop of small fruits is large, and the price is fully average so far. The late rains have been very beneficial to all our growing crops, and generally they are looking much better than at the same time last year.

Groton (DANIEL NEEDHAM). — Hay crop largely secured, and is of first-rate quality and at least nine-tenths of an average. Outlook for rowen is poor. Prospect fair for fall apples; poor for winter. Good yield of small fruits, with average prices. Early potatoes about the average in yield; price \$1.40 per bushel. Moderate rains have kept the surface of the earth fairly moistened, so that the pastures and hills never looked better; but the springs are low. All garden as well as field products look exceptionally well.

ESSEX COUNTY.

Haverhill (EBENEZER WEBSTER). — We have had excellent weather to make hay, and the crop has been secured in good order. Some have more than last year and some have less. On the whole, the crop is about an average and is of good quality. Outlook for rowen not very good at present. Prospect good for fall apples; poor for winter. Good yield of raspberries and blackberries; strawberries fair; prices about the same as last year. Fair crop of early potatoes; no rot. The price started at \$1.50 per bushel but has fallen now to 50 cents.

Groveland (ABEL STICKNEY). — Quantity of hay a little less than average; quality better. Outlook poor for rowen. To-day (29th) it is raining and perhaps rowen will look better, as rain is needed very much. Small crop of apples. Small fruits are yielding well, and prices compare well with the past. Early potatoes are yielding well; average price about \$1.00 per bushel. Nearly all grain is cut for hay.

Rowley (T. P. HALE). — We have just finished haying, with quantity about two-thirds of an average and quality fine. The outlook for rowen is good. Prospect of one-half a crop of apples. Early potatoes good yield and fair price, now about \$1 per bushel. Rye is good. Corn is a little backward, and August must be exceptionally favorable to complete the crop.

Ipswich (O. C. SMITH). — Hay is secured, except on the wet meadows. The crop averages about seventy per cent; quality good. Early cut fields, with sufficient rain, promise an average yield of rowen. Fall apples promise well; winter apples small crop. Russets and Greenings will be a full average, but there are only now and then Baldwin trees with any fruit upon them. Cultivated small fruits are average crops and wild fruits large crops. Fair prices for both have been realized. Yield of early potatoes about an average. Prices started at \$1.25. Farmers have rushed them to market, and they have dropped to 75 cents per bushel; and slow sales at that. More oats and barley are raised to cut in

milk for fodder than are raised for grain. The yield has been a full average and quality good.

Topsfield (B. P. PIKE). — Quantity of hay a little below the average ; quality good. Outlook for rowen fair, but the crop will be late. The apple crop will be below the average. Yield of early potatoes good ; price from 75 cents to \$1 per bushel. Oats good. Oats and barley not generally threshed, but are cut for fodder.

Marblehead (W. M. S. PHILLIPS, Jr.). — Haying not all done. Quantity perhaps ten per cent less than an average ; quality unexcelled. Outlook for rowen very fair, especially on early cut ground. Prospect for apples not very promising. Early potatoes not quite up to last year in yield ; average price 65 cents per bushel. Potatoes are rotting some. Pastures are getting poor, and cows are shrinking in milk. More rain is needed.

NORFOLK COUNTY.

Franklin (C. M. ALLEN). — Hay crop eighty per cent in quantity ; quality excellent. Wet meadows are now being cut and a very good crop is being secured. The meadows are in condition to secure the whole crop, unless heavy rains come very soon. The outlook is for more than an average crop of rowen. Prospect of an average crop of apples. Strawberries were light ; raspberries and blackberries heavy crops. A good yield of early potatoes ; price \$1.25 to \$1.50 per bushel. Grain crops a good average.

Medfield (GEO. R. CHASE). — Hay crop secured ; quality excellent ; three-fourths of an average crop in quantity, except on newly seeded land. Outlook for rowen poor unless rain comes soon. Small crop of apples. Small crop of small fruits ; prices twenty to twenty-five per cent above average. Yield of early potatoes fair ; average price \$1.12 per bushel. Rye and barley promise well. Corn is in splendid condition. All crops but grass are above the average.

Medway (MONROE MORSE). — Hay crop mostly secured and quantity four-fifths of an average ; quality one hundred per cent. Rather poor outlook for rowen. The prospect is for three-fourths of an average crop. Strawberries were an average in quantity and price. Raspberries and blackberries are yielding abundantly, and prices are rather low. Early potatoes promise well, and but few have been harvested. Rye is good in quantity and quality.

Weymouth (H. W. DYER). — The hay crop has been secured and is larger and better than usual. The outlook for rowen is

good. The prospect for a crop of apples, both fall and winter, is good. The yield of small fruits has been good and prices fair. The yield of berries is very large. The yield of rye, oats and barley is larger than usual.

BRISTOL COUNTY.

Mansfield (D. E. HARDING). — The first of the season the outlook for hay was not very encouraging, but the rains brought it forward so we had an average crop. Outlook for rowen very fair; good if rain comes. Small crop of apples. Small fruits are yielding well; hardly an average of prices. Early potatoes more than an average crop. Rye and oats a fair yield. Vegetables are fine and abundant.

Raynham (N. W. SHAW). — Hay is nearly all secured, but much later than usual, so that the quality is not as good. The outlook at the present time for rowen is good. Small fruits have yielded well; prices have been above the average. The yield of early potatoes has been good; prices from 80 cents to \$1 per bushel. Weeds are thriving wonderfully, and the farmer need not have much idle time.

Berkley (R. H. BABBITT). — Hay crop is being secured, but is lacking in quantity and quality. Outlook very favorable for rowen. The crop of apples will not be heavy. The crop of small fruits is about an average one, with prices rather low. The yield of early potatoes has been good; average price 90 cents per bushel.

Somerset (JOSEPH GIBBS). — The hay crop has been secured and the quality is good. The quantity as compared with last season will be about sixty-five per cent. The outlook for rowen is not good, owing to the dry weather. The apple crop, both fall and winter, will be light. Small fruit growers have, with few exceptions, had a very poor season. Prices were unusually low. The business seems to be overdone. The yield of early potatoes is above the average, and prices have run from \$1.50 to 65 cents per bushel.

Dartmouth (L. T. DAVIS). — The hay crop in this section was larger than was anticipated early in the season, and was of fine quality; but owing to heavy fogs and showers was housed in rather poor condition. Outlook for rowen not at all promising. Apples rather poor in this section. Small fruits about an average with us in price and quantity. Early potatoes in some places are very good; others rather poor; price so far averages \$1.25 per bushel. We have had some cold nights.

PLYMOUTH COUNTY.

West Bridgewater (F. E. HOWARD). — Hay crop has been secured; quantity less than an average season, just about two-thirds of last year; quality first rate. Outlook for rowen quite good. Prospect for crop of apples with me quite good, except Baldwins. Small fruits are yielding remarkably well and prices are satisfactory. Potatoes are very late, but the yield is good and prices low for the season. Very little if any oats and barley raised for seed; some sown for fodder. Some of our farmers are quite successful with rye; about twenty-five bushels to the acre.

Brockton (DAVIS CORLEAND). — Hay crop secured in good condition. Outlook for rowen is good. Rather poor prospect for apples. Good yield of small fruits; low prices. Yield of early potatoes is good, but prices low; 75 cents per bushel. Vegetables are plenty and prices very low.

Marshfield (GEO. J. PETERSON). — There has been some loss in the hay crop by the continued wet weather. Rowen will be lighter than last year. Apples are yielding fairly. Late apples are looking well. Strawberries have been abundant on the borders of the ocean and prices have been higher. Other fruits are coming in plenty. Early potatoes are better than last season. Rye has done well in this section.

Kingston (J. H. CUSHMAN). — English hay about all secured; three-fourths of an average crop in quantity, and of good quality. Rowen is small. Both fall and winter apples are rather scarce. Small fruits were cut short by dry weather; prices above the average. Large yield of early potatoes; price about \$1.25 per bushel. Some complaint of potato rot.

Lakeville (ELBRIDGE CUSHMAN). — The hay crop is secured; quality good; quantity about an average. Outlook good for rowen. Prospect of fair crop of Greening apples; Baldwins are scarce. Good yield of small fruits; prices compare favorably with an average season. Very good yield of early potatoes; price \$1.25 to \$1 per bushel. Rye and oats were good. Taking all crops into account I think it has been a full average year for the farmer. Prices are fully average, with a fair demand.

Wareham (A. SAVARY). — Hay crop generally well secured; is three-fourths of a crop and is of good quality. Outlook for rowen very good on low land. No apples of any consequence. Crop of strawberries small; other small fruits fair, and average prices. Early potatoes have done well; price \$1.50 per bushel. Weather during July quite favorable for farmers. Nights rather too cool for corn and melons.

BARNSTABLE COUNTY.

Falmouth (D. R. WICKS). — Hay all secured, and the crop is a little more than one-half in quantity, but of good quality. Outlook for rowen very poor, as dry weather holds on. Prospect for apples fair, but they are dropping badly. Yield of small fruits fair. Strawberries with me average $17\frac{1}{2}$ cents per box. Potatoes here have suffered for want of rain, and blight has struck both early and late varieties. Oats are grown for fodder.

Mashpee (W. F. HAMMOND). — About three-fourths of a crop of hay; quality good. Rowen promises well. One-fourth of a crop of apples. Crop of small fruits light. Prices a third higher than last year. Early potatoes have yielded better than for some years; average price \$1 per bushel; last year \$1.25. Yield and quality of oats and rye have been fair. The prospect for a crop of cranberries looks better than for the past two years.

Dennis (JOSHUA CROWELL). — Hay all secured; quantity two-thirds of an average; quality good. Outlook unfavorable for rowen. Apples are not plenty. Yield of small fruits below the average, and prices about the same as usual. Early potatoes yielded well; average price \$1 per bushel. Late potatoes are looking well.

Eastham (J. A. CLARK). — Hay crop less than an average; quality good. Outlook poor for rowen, unless we have rain soon. Fair prospect for a crop of apples. Not many small fruits raised. Grapes are looking finely. Early potatoes are good, and have been selling for \$1 per bushel; now 75 cents. Very little grain raised.

DUKES COUNTY.

West Tisbury (WM. J. ROTCH). — The hay crop has been secured in good condition and quality; but English hay is light, and perhaps sixty per cent of a fair crop. The outlook for rowen is good. There is a prospect of an average crop of apples. The drought in June injured strawberries. The crop was sold for an average price of 15 cents per box. The yield of early potatoes is heavy; average price \$1 per bushel, now 80 cents. The grain crops are average ones.

NANTUCKET COUNTY.

Nantucket (CHAS. W. GARDNER). — Hay crop mostly secured; quantity two-thirds of a crop; quality not as good as the average, on account of wet weather. Potatoes are yielding extra well in quantity and quality; \$1.50 per bushel. Heavy yield of straw, but there is not much threshed here, being mostly made into hay or fodder.

CROPS IN MASSACHUSETTS.

YIELDS AND VALUES PER ACRE AS COMPARED WITH OTHER STATES.

COMPILED FROM ALBUM OF AGRICULTURAL GRAPHICS, PUBLISHED BY
AUTHORITY OF THE SECRETARY OF AGRICULTURE,
WASHINGTON, D. C., 1890.

CORN (MAIZE).

AVERAGES OF TEN YEARS (1880-89).

The average yield per acre in the whole country is given as 24.1 bushels, and the average value per acre as \$9.47. Massachusetts shows an average yield of 31.6 bushels, with an average value per acre of \$22.94. It is interesting to note that Nebraska leads in average yield per acre, with 32.8 bushels, followed closely by New Hampshire, with 32.7; Vermont, with 32.5; and Maine, with 32.2. It is found that, with the single exception of Nebraska, the only States showing a yield of over 31.5 bushels per acre are New England States. The only States showing a yield of less than 10 bushels are South Carolina, with 9.4, and Florida, with 9.7. New Hampshire leads in the average value per acre, with \$24.32, closely followed by Maine, with \$24.25; and Vermont, with \$23.18. The only States showing a value of over \$20 per acre are all New England States, with the single exception of Montana, with \$20.12. The States showing the lowest values are South Carolina, with \$6.19; Georgia, with \$6.81; North Carolina, with \$7.15; Florida, with \$7.22; Nebraska, with \$7.58; Alabama, with \$7.69; and Kansas, with \$7.90. All the others are over \$8.25. The value per acre of corn in the New England States ranges from \$24.32 in New Hampshire to \$20.94 in Connecticut, — more than twice the general average. New York,

New Jersey and Pennsylvania, producing far less than their consumption, are nearer the source of supply, reducing the value to about \$18 per acre. In the Southern States, except Arkansas, the prices are below the national average, the supply being nearly equal to requirements, grown on a superficially cultivated area of cheap lands and, therefore, at a low rate of yield.

OATS.

AVERAGES OF TEN YEARS (1880-89).

The average yield per acre in the whole country is given as 26.6 bushels, and the average value per acre as \$8.16. The average yield per acre in Massachusetts is given as 29.9 bushels, and the average value per acre as \$14.44. Washington leads in yield per acre, with 36.0 bushels, followed by Illinois, with 34.2; Minnesota and Vermont, with 33.1; and Montana, with 32.6. The lowest are North Carolina, with 9.5; Georgia, with 9.8; and Florida, with 10.2. In average value per acre Nevada leads, with \$18.15; followed by Montana, with \$15.24; Idaho, with \$15.09; and Washington, with \$15.08. The lowest are North Carolina, with \$4.56; Virginia, with \$4.73; Tennessee, with \$5.20; Georgia, with \$5.85; and Nebraska, with \$5.78. All the others are over \$6.00. In the South the crop can only be grown in the winter, and the average yield is reduced by the custom of growing more for winter grazing than for seed. The increase in area of oats has been extraordinary, the breadth doubling in a little more than a decade. The principal breadth in oats is in the States of the northern border.

RYE.

AVERAGES OF TEN YEARS (1880-89).

The average yield per acre for the whole country is 11.9 bushels, and the average value per acre is \$8.27. The average yield per acre in Massachusetts is given as 14.3 bushels, and the average value as \$12.46. In yield per acre Colorado leads, with 17.1 bushels, followed by Oregon, with 15.9; Illinois, with 15.5; and Kansas, with 15.2. The lowest are South Carolina, with 4.6; Georgia and Alabama,

with 5.5 ; and North Carolina, with 5.8. All the others are over 6.0. In average value per acre Colorado leads, with \$12.78, followed by Massachusetts, with \$12.46 ; Maine, with \$12.26 ; Oregon, with \$11.88 ; and Vermont, with \$11.85. The lowest are Tennessee, with \$4.67 ; Virginia, with \$4.71 ; and North Carolina, with \$4.82. All the others are over \$5.00. No figures for yield or value are given for Florida, Nevada, Arizona, Montana, New Mexico and Wyoming. Rye is a crop for poor soils, and is not much grown in this country. The average yield in the South is lower by reason of the fact that it is grown more for winter pasturage than for seed.

BARLEY.

AVERAGES OF TEN YEARS (1880-89).

The average yield per acre for the whole country is given as 21.7 bushels, and the average value per acre as \$12.76. The average yield per acre for Massachusetts is given as 23.2 bushels, and the average value per acre as \$18.77. In average yield per acre Washington leads, with 29.1 bushels, followed by Idaho and Montana, with 27.2 ; Oregon, with 26.0 ; and Maryland, with 25.5. The lowest are Alabama, with 10.4 bushels ; and North Carolina, with 11. All the others are over 13. In value per acre Maryland leads, with \$20.47, followed by Rhode Island, with \$19.13 ; Massachusetts, with \$18.77 ; and Nevada, with \$18.29. The lowest are Nebraska, with \$7.59 ; Kansas, with \$7.90 ; Dakota, with \$9.02 ; Tennessee, with \$9.27 ; and North Carolina, with \$9.65. All the others are over \$10.30. No figures of yield or value per acre are given for Delaware, Florida, Mississippi, Louisiana, Arkansas and Wyoming. Barley has a higher value per acre than any other cereal. Its distribution is by no means general, as California, Wisconsin, Minnesota and New York are the main factors in its production, producing half of the crop.

BUCKWHEAT.

AVERAGES OF TEN YEARS (1880-89).

The average yield per acre for the whole country is given as 12.8 bushels, and the average value per acre as \$8.24. The average yield per acre in Massachusetts is given as 14.2

bushels, and the average value per acre as \$10.01. In yield per acre California leads, with 20.8 bushels, followed by Vermont, with 18.2; Maine, with 18.1; and New Hampshire, with 17.4. The lowest are Tennessee, with 8.5; Kentucky, with 9.5; and North Carolina, with 9.7. All the others are over 10. With the exception of California, Delaware and Oregon, the only States showing a yield of over 14 bushels per acre are in New England. In average value per acre California leads, with \$15.69, followed by New Hampshire, with \$10.90; Vermont, with \$10.88; Oregon, with \$10.23; Maine, with \$10.14; and Massachusetts, with \$10.01. All the others are under \$10, with Tennessee lowest, with \$5.66, and North Carolina next, with \$6.10. No figures of yield or value per acre are given for South Carolina, Georgia, Florida, Alabama, Mississippi, Louisiana, Texas, Arkansas, Nevada, Idaho, Montana, New Mexico, Utah, Washington and Wyoming. Buckwheat is by no means a general crop, the larger portion being grown in New York and Pennsylvania.

POTATOES.

AVERAGES OF TEN YEARS (1880-89).

The average yield per acre for the whole country is given as 76.2 bushels, and the average value per acre as \$38.34. The average yield per acre in Massachusetts is given as 95.5 bushels, and the average value per acre as \$61.97. In yield per acre Washington leads, with 117.1 bushels, followed by Montana, with 107.4; Idaho, with 101.3; and Oregon, with 100. The lowest are South Carolina, with 55; Georgia, with 58.8; and Tennessee, with 59.2. In value per acre Nevada leads, with \$76.25; followed by Montana, with \$73.03; Florida, with \$65.65; and Rhode Island, with \$62.55. The lowest are Tennessee, with \$30.49; Nebraska, with \$30.68; Kentucky, with \$30.90; and Indiana, with \$31. Like oats the potato is adapted to the cool climates of the higher latitudes.

TOBACCO.

AVERAGES OF TEN YEARS (1880-89).

The average yield per acre for the whole country is given as 727.1 pounds, and the average value per acre as \$61.51. The average yield per acre in Massachusetts is given as

1,485.4 pounds, and the average value per acre as \$204.28. In yield per acre Massachusetts leads, with 1,485.4 pounds, followed by Connecticut, with 1,417.1; New York, with 1,339.6; Pennsylvania, with 1,205.3; Wisconsin, with 967.2; and Ohio, with 912.8. All the others are below 900 pounds per acre. In value per acre Massachusetts leads, with \$204.28, followed by Connecticut, with \$196.58; New York, with \$159.56; Pennsylvania, with \$143.22; and Wisconsin, with \$101.45. All the others are below \$100. No figures for yield or value per acre are given for any States or Territories west of the Mississippi River except Missouri and Arkansas, or for Maine, Vermont, New Hampshire, Rhode Island, New Jersey, Delaware, South Carolina, Georgia, Florida, Alabama, Mississippi, Minnesota and Iowa. The highest yields and prices per pound are for seed-leaf tobacco, used exclusively for cigars, and grown solely in the Northern States, and mainly in a few counties on the Connecticut River, three in New York, three in Pennsylvania, and in limited districts in Wisconsin and Ohio.

HAY.

AVERAGES OF TEN YEARS (1880-89).

The average yield per acre for the whole country is given as 1.19 tons, and the average value per acre as \$11.08. The average yield per acre for Massachusetts is given as 1.09 tons, and the average value per acre as \$18.82. In yield per acre California and Oregon lead, with 1.39 tons, followed by Minnesota, with 1.32; Nebraska and Washington, with 1.31; and Dakota, with 1.30. The lowest is New Hampshire, with .93, followed by Rhode Island, with .96; Maine, with .97; Florida, with .98; and Connecticut, with .99. All the others are above one ton per acre. In value per acre Massachusetts leads, with \$18.82, followed by Georgia, with \$17.31; New Jersey, with \$16.79; Alabama, with \$16.54; Florida, with \$16.37; Rhode Island, with \$16.19; Mississippi, with \$16.16; and California, with \$16.02. The lowest are Nebraska, with \$4.82; Dakota, with \$5.10; and Kansas, with \$5.55. All the others are over \$6.35. There is a great difference in the State values of hay. Massachusetts has naturally the highest average, \$18.82 per acre, having the fewest numbers engaged

in agriculture in proportion to the whole population, and therefore the largest relative demand. Nebraska has the smallest average, \$4.82, as large areas of grass are had for little more than the cost of cutting. It has been relatively high in the South, because grass has been deemed inimical to agriculture under the cotton régime, and not generally tolerated.

The yield per acre is an important element in value per acre, but not the only one. The price per pound or bushel also differs, owing to distance from market and local scarcity or abundance. The tendency of railroad extension is toward equalization of prices, yet the difference in State averages of price shows how great differentiation in price still exists. It naturally happens that where prices are low yields are also low from lack of inducement to high culture, intensifying the disparity in values per acre. A study of these differences may surprise the casual reader, and may prove fruitful of practical suggestions if made with care and thoughtfulness.

MASSACHUSETTS
CROP REPORT

FOR THE
MONTH OF AUGUST, 1891.

COMPILED BY
WM. R. SESSIONS,
SECRETARY STATE BOARD OF AGRICULTURE.

BOSTON :
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1891.

CROP REPORT FOR THE MONTH OF AUGUST, 1891.

COMPILED FROM RETURNS TO THE OFFICE OF THE STATE BOARD OF
AGRICULTURE, AUG. 28, 1891.

OFFICE STATE BOARD OF AGRICULTURE,
BOSTON, MASS., Sept. 3, 1891.

Bulletin No. 4, Crop Report for the month of August, is herewith presented. For this issue blanks for returns were sent to one hundred and sixty correspondents and one hundred and twenty-one were returned in season to be incorporated in the bulletin.

In the circular to correspondents returnable to this office August 28, the first question asked was: "What is the outlook for Indian corn as compared with an average season?" In answer to this question 37 correspondents state that the crop promises to be more than an average, 40 an average one, 34 a good one and 10 below an average. The crop promises well in all counties except Barnstable, where it has been greatly injured by dry weather.

The second question asked was: "Do you think rowen will be an average crop?" Fully three-fourths of the replies to this question are to the effect that rowen does not promise to be an average crop. Some state that it promises to be an average and a very few that it will be more than an average. Some state that there is scarcely any. The cause of the shortage is due to dry weather and late cutting of the first crop. It is presumed that the abundant rains the last week in August will greatly benefit the crop.

The third question asked was: "What is the outlook for late potatoes?" Of the 97 replies to this question 53 state that the outlook for late potatoes is good; 20 that it is excellent; 13 that it is fair; 7 that it is not very good; and 4 that the crop will be light. The crop appears to promise about as well in one county as another.

The fourth question asked was: "Have you observed potato blight or rot? If so, state the date first noticed." Nearly all of the correspondents state that they have observed either blight or rot. It is not thought that rot is severe yet, though it may become so with favorable weather. Several report that they noticed what they considered to be blight about the middle of July. Most, however, report having observed blight or rot after August 1.

The fifth question asked was: "What is the general condition of dairy stock in your vicinity?" Most of the correspondents report dairy stock as being in either good, excellent or average condition while about 25 state that it is not up to the average; some report cows as being thin in flesh and a number that there has been a shrinkage in the quantity of milk given.

The sixth question asked was: "Has dairying been as profitable this year as usual?" To this question 72 correspondents answer yes, 39 no, and 10 state that dairying this year has been more profitable than last. The chief drawbacks to successful dairying this year have been shortness of pasture feed and high price of grain. It has been necessary to feed stock in the barn, thus increasing the expense.

The seventh question asked was: "Do you think the dairy interests of the State are seriously affected by the manufacture and sale of oleomargarine?" Of the 70 direct replies to this question 56 say yes and 14 say no. Some state that oleomargarine is not sold or used in their town, to their knowledge, and they know very little about it. Others state that they do not think the sale of oleomargarine injuriously affects the sale of good dairy products but that it drives poor butter out of the market.

It seems to be the general opinion among dairymen that the manufacture and sale of oleomargarine seriously affects the dairy interests. Correspondents connected with co-operative creameries state this to be their belief. This injury is more manifest when oleomargarine is sold as butter.

The last legislature passed an act entitled "An Act to provide for the protection of dairy products and to establish a state dairy bureau." This law went into effect September 1, and states in what ways oleomargarine and butterine

shall not be sold, and provides punishment for offenders. For the enforcement of this law the governor is authorized to appoint three members of the Board of Agriculture to constitute a dairy bureau of the Board, to serve without pay. The secretary of the Board is made the executive officer, and the governor has authority to appoint an assistant to him. The bureau is allowed to expend \$4,000 annually in carrying forward the work. The bureau is empowered to investigate dairy and imitation dairy products bought or sold; to enforce all laws for the manufacture, transfer and sale of such products; to investigate methods of butter and cheese making, and to disseminate information in the interests of the dairy industry.

A statistical and historical article upon the subject of oleo-margarine will be found printed at the end of the bulletin.

A portion of the tobacco crop has been harvested in good condition. Considerable has been sold in the field at unusually good prices. Favorable weather for harvesting and curing is anxiously looked for by the growers.

Crops in the market gardens around Boston are looking unusually well. Celery, squashes, tomatoes, etc., promise to be good crops. The pear crop throughout the State is very large.

Report No. 87 of the Statistician of the United States Department of Agriculture gives the following figures of estimated condition of crops in Massachusetts Aug. 1, 1891: Average condition of corn, 97; average condition of spring rye, 97; average condition of oats, 96; average condition of barley, 94; average condition of buckwheat, 99; average condition of potatoes, 99; average condition of tobacco, 99; average condition of timothy hay, 86; product of clover compared with a full crop, 82; average quality of clover hay, 100 standing for high quality, 91; average condition of pasture, 100; average condition of apples, 70; average condition of peaches, 69; average condition of grapes, 95.

CONDITION OF CROPS IN THIS SECTION.

FROM UNITED STATES WEATHER-CROP BULLETINS.

Week ending August 7. — New England: The weather has been too cool for hay and the grain harvest, and also for

the growth of crops. There are indications of potato rot in western Massachusetts. An average cranberry crop is reported from Plymouth, Mass.

Week ending August 14. — New England: Drought severe in central and south-eastern portions; pastures suffering; wells and cisterns very low. Corn has grown well. Potatoes promise a large yield, and there is but little rot reported. Tobacco promises an excellent yield.

Week ending August 21. — New England: Grain is being harvested, with heavy yields. Tobacco cutting is progressing and promises the best crop for years.

Week ending August 28. — New England: Weather favorable for growth of corn and grasses, but very unfavorable for maturing and harvesting of crops. Potato rot general, though not severe. Tobacco not injured.

TEMPERATURE AND RAINFALL FOR THE WHOLE COUNTRY.

FROM UNITED STATES WEATHER-CROP BULLETINS.

Week ending August 7. — General deficiency in temperature. Excess in the Dakotas, Wyoming, Nebraska and the south-east portion of the south Atlantic States. Excess of rainfall along the northern border, from Michigan to the Pacific Ocean, and in the major portion of the south Atlantic and Gulf States.

Week ending August 14. — General excess in temperature. General deficiency in rainfall.

Week ending August 21. — Excess in temperature except in the Rocky Mountain region and southern Florida. Greatest excess in the central valleys, including the greater portion of the corn region. Excess in rainfall from the Atlantic coast southward to the Gulf States and westward to the Rocky Mountains, and in southern Florida.

Week ending August 28. — The week was warmer than usual, both on the Atlantic and Pacific coasts, and was unusually cool throughout the central valleys, frosts occurring in some of the northern sections. The rainfall during the week was generally in excess over the regions east of the Mississippi; also in the interior of Texas and at northern Rocky Mountain stations. The rainfall in the south Atlantic States was unusually heavy.

MASSACHUSETTS WEATHER.
Meteorological Data for August, 1891.

STATION.	TEMPERATURE. DEG. F.					PRECIPITATION.		Prevailing Wind.	CLOUDINESS. NO. OF DAYS.		
	Mean.	Maximum.	Date.	Minimum.	Date.	Total in Inches.	Days with Precipitation.		Cloudy.	Partly Cloudy.	Cloudless.
Monroe, .	64.9	88	11	41	1	3.75	7	-	8	5	18
Springfield, .	72.1	92	11	50	1	4.01	12	S.	11	15	5
Amherst, .	68.8	90	11	46	1	3.67	13	N. E.	14	11	6
Royalston, .	70.7	88	11	54	29	4.00	7	S. W.	-	-	-
Fitchburg,* .	68.6	90	11	54	31	2.48	14	W.	10	12	9
Princeton, .	67.3	88	11	46	1	1.99	16	W.	-	-	-
Dudley, .	71.8	94	11	53	29, 30, 31	2.58	10	S. W.	16	8	7
Framingham, .	69.4	94	11	45	1	5.22	12	-	-	-	-
Concord, .	69.2	93	11	50	3	2.85	11	S. W.	13	6	12
Lawrence, .	71.6	94	10, 11	50	1	2.01	9	S. E.	9	9	13
Ipswich, .	70.8	94	10, 12	54	1	2.00	10	S. W.	8	18	5
Boston, .	70.0	90	12	54	1	3.87	13	S. W.	8	14	9
Middleboro', .	68.3	-	11	41	1	3.22	9	S. W.	9	17	5
New Bedford, .	70.2	93	10	50	20	2.17	15	-	-	-	-
Nantucket, .	68.9	84	10	57	30, 31	3.41	8	S. W.	4	6	21
Provincetown, .	69.9	90	11	53	20	3.93	9	-	-	-	-

* Temperature data from thermometer not self-registering.

Summary.

Temperature (F.). — Monthly mean, 69.5°. Highest monthly mean, 72.1° at Springfield; lowest monthly mean, 64.9° at Monroe; maximum, 94° at Dudley and Framingham on the 11th and Lawrence on the 10th and 11th; minimum, 41° at Monroe and Middleborough on the 1st; range, 53°; greatest local monthly range, 49° at Framingham; least local monthly range, 27° at Nantucket; greatest daily range, 35° at Concord on the 8th; at Lawrence on the 3d and at Middleborough on the 7th; least daily range, 2° at Ipswich on the 27th. Average temperature for August at Springfield for twenty-four years, 70.5°; average for August, 1891, 72.1°; departure, +1.6°. Average temperature for August at Boston for twenty-one years, 69.1°; average for August, 1891, 70.0°; departure, +0.9°.

Precipitation. — Average, 3.07 inches; greatest, 5.22 at Framingham; least, 1.99 at Princeton. Average for August at Springfield for forty-four years, 4.52; for August, 1891,

4.01; departure, 0.51. Average for August at Boston for twenty-one years, 4.41; for August, 1891, 3.87; departure, 0.54.

Prevailing wind, — South-west.

Thunder-storms, — 6th, 7th, 12th, 15th, 18th, 23d, 24th, 28th.

Meteoric showers, — Ipswich, 10th, 11th.

REMARKS.

The mean temperature for the month of August, 1891, at those stations in Massachusetts having records for more than ten years, was slightly above the normal, being somewhat in contrast with the month of July in this respect. The amount of excess varied from 0.9° at Boston to 1.6° at Springfield. The days of highest temperature were the 10th, 11th and 12th, although the days from the 21st to 28th, under the hot moisture-laden southerly winds that prevailed were oppressively warm. The maximum was several degrees lower than was experienced in June (an unusual fact) and occurred on the 11th, except along the coast where a well defined sea-breeze was felt. This breeze was first noted at Swampscott at about nine o'clock A.M. and from thence extended well inland. At Cambridge the heat on the 11th was considerably tempered by the sea-breeze but at Chestnut Hill it was scarcely felt, and at Lake Cochituate and Concord, not at all, or if felt it was too late to influence the maximum temperature. The minimum temperature occurred generally on the morning of the 1st, but it was very cool on the 3d, 20th and the last three days of the month. No frost has been reported.

The number of cloudy and rainy days was in excess, except at Nantucket and a few other local sections, but the precipitation was nearly one inch below the average. The thunder-storms were neither frequent nor unusually heavy. High wind accompanied a storm on the 12th, which did some damage to fruit and crops, and slight damage was done by heavy rains on the 28th. At Amherst 0.35 inches of rain fell in ten minutes, and at Provincetown over one inch fell from 3.55 to 4.40 P.M. Heavy rains fell, also, at Nantucket on the 30th.

NOTES OF CORRESPONDENTS.

(Mailed to us August 28.)

BERKSHIRE COUNTY.

Sheffield (DWIGHT ANDREWS).—Indian corn promises more than an average. Do not think rowen will be an average crop. There are indications of potato rot. Blight appeared about July 20. Dairy stock is thin in flesh. I think dairying has been about as profitable this year as usual.

Egremont (J. H. ROWLEY).—Corn is two weeks late but promises an average crop if frost holds off till September 10. Rowen will not be an average crop. Late potatoes promise a full average crop. Have noticed neither blight nor rot. Condition of dairy stock good. Dairying has been as profitable this year as usual.

Monterey (WM. S. BIDWELL).—Outlook for Indian corn is fair. Do not think rowen will be an average crop. Outlook for late potatoes is good. Have observed blight but no rot. Condition of dairy stock is good and dairying has been more profitable this year than usual.

Lee (A. BRADLEY).—Indian corn promises to be a little better than an average crop. Rowen will not be up to the average. Blight struck late potatoes August 1 and some pieces are rotting very badly. General condition of dairy stock is good but not quite up to last year. The product per cow is a little short.

Cheshire (L. J. NORTHUP).—The outlook for Indian corn is promising as compared with an average season. Rowen is looking well where the ground is in good heart. Outlook for late potatoes is good but I hear of some fields that are rotting. Potato vines are all dead in this locality; commenced to die ten days ago. The general condition of dairy stock is good. Dairying has been more profitable this year than usual.

FRANKLIN COUNTY.

Ashfield (A. G. HOWES).—Outlook for Indian corn good. Backward the first part of the season, but now progressing rap-

idly. Rowen will not be an average crop. Late potatoes promise a fair crop. Noticed blight about the 20th. Farmers are digging potatoes this week. Pastures are generally short, and stock is not in as good condition as last year. Prices of dairy products are better than last year.

Charlemont (HENRY S. GILES).—Outlook for Indian corn is good if there is no early frost. The rowen crop will not be as large as in some years. Newly seeded pieces will be very good. Outlook for late potatoes is very good if they are not seriously affected by blight. Have observed no rot. Noticed blight on some fields as early as the 10th of August. Condition of dairy stock is very good and will continue so with care and proper feeding. Think dairying has been as profitable this year as usual. Dairying is a profitable business if rightly conducted. With short feed in pastures cows should have extra care and feed.

Colrain (A. A. SMITH).—Outlook for Indian corn better than usual, with very little smut. Rowen promises to be an average crop. Am unable to tell as to the outlook for late potatoes, but have much fear of rot. Observed blight about August 1. General condition of dairy stock is good, seldom better; feed good; and cows in fine condition. Dairying has been more profitable this year than usual.

Deerfield (CHARLES JONES).—There is a good growth of corn and the warm weather has brought it forward so it is nearly up to an average season. Rowen is nearly ready to cut and will be a light crop. Potatoes are a good crop and appear to be healthy; have noticed neither blight nor rot. General condition of dairy stock is good, and dairying has been as profitable as usual. Onions are looking well and will be a good crop. Growers are being offered about fifty cents a bushel. Tobacco is extra good and is being harvested. Some have sold to be delivered in the bundle, price from thirteen to twenty-two cents per pound.

Northfield (CHARLES POMEROY).—Indian corn promises more than an average crop. Rowen will not be up to the average, on account of drought. There will not be a full crop of late potatoes because of dry weather. Noticed blight about August 10, but have seen no rot. Condition of dairy stock is very good. On an average dairying has been fully as profitable as usual this year; months of May and June better than usual.

Orange (ANSEL HARRINGTON).—Crop of Indian corn promises to be fully equal to an average season. Rowen will be more than an average crop. Outlook for late potatoes very good. Noticed a little blight about the 20th and have just discovered a little rot. General condition of dairy stock very good. Dairying about as

profitable as usual. I think, taking all things into consideration, this must be one of the most prosperous seasons for farmers in this vicinity that we have had for many years.

HAMPSHIRE COUNTY.

Amherst (C. E. WILSON). — The outlook is for an average crop of Indian corn. Rowen will be an average crop; the late rains have helped it. The outlook for late potatoes is very good. Noticed potato rot August 26. General condition of dairy stock is very good and dairying has been more profitable this year than usual.

Hadley (L. W. WEST). — Indian corn promises to be a good crop. Rowen will not be an average crop. Not many late potatoes raised in this section. Noticed blight July 28. General condition of dairy stock is good. Think dairying has been as profitable this year as usual. In most places the quantity of milk has been smaller than usual, probably owing to the dryness of the season. The price of butter has been higher than usual. Since last report 6.47 inches of rain have fallen; July 31, 1.50 inches; August 22, 1.42 inches; August 28, 1.23 inches.

Northampton (D. A. HORRON). — The acreage of Indian corn is large and fully up to the standard. Rowen will be a light crop. The outlook for late potatoes is good. Dairy stock is looking well and dairying has been about as profitable as for the last three years.

Goshen (ALVAN BARRUS). — Indian corn looks well but is still late, which will injure the earing somewhat. Think rowen will not be an average crop and will be late. Late potatoes will be rather a light yield. Noticed blight about August 15 but have seen no rot yet. Should say the general condition of dairy stock is good. Dairying fully as profitable as usual except for the high price of grain.

Southampton (C. B. LYMAN). — The warm weather for the past three weeks has developed Indian corn very rapidly. It will be fully up to the average and is well eared out. The rains of the past week have started rowen and there will be a better crop than was expected. Late potatoes are full grown and are yielding well. Have noticed neither blight nor rot. Dairy stock looks fairly well. There has been a shrinkage in milk, on account of dry pastures. Think dairying has been as profitable this year as usual as butter has brought a better price than in the past few years. Tobacco crop is the best ever harvested.

HAMPDEN COUNTY.

Holyoke (JOHN C. THORPE).—Indian corn is looking finely and above the average on light land. Rowen will be about two-thirds of a crop. Outlook for late potatoes good. Dairy cows have given a good flow of milk this season and are in good condition. Milk has sold well, with but little surplus. Prices are about the same as in past years.

West Springfield (T. A. ROGERS).—Indian corn promises to be above the average but is about a week late. Think rowen will be a full average; did not start early but is growing fast now. Outlook for late potatoes good for an average crop. Have noticed nothing to be called blight, but the dry weather in the first part of July hurt potatoes on dry land. Stock is looking very well. Pastures are better to-day than the first of June. Dairying is about as usual. It is hard to realize a profit.

Blandford (E. W. BOISE).—The season on the whole has been dry. The past week has given much rain. All crops are proving very extra. Hay above the average, extra quality. Spring grains fully twenty five per cent above the average yield. Potatoes good average crop, large size and fair. Late varieties appear within the last week to be struck with blight, but no rot reported as yet. Fruit will be a fair crop. Dairy stock has done up to the average, though of late it has fallen off on account of dry pastures. The rains of the past week will give feed and second crop hay a good start. Corn stands very extra. On the whole thus far we all should be thankful for a prosperous season.

Ludlow (C. B. BENNETT).—Indian corn promises to be above an average crop. Outlook for late potatoes is poor. Have observed no rot, but blight appeared about the 15th. Potatoes are scabbing badly. Dairy stock is thin, owing to short pasturage. Dairying has not been as profitable this year as usual, on account of the high price of grain. Clover rowen looks fair but rowen generally looks badly. The crop will be about two-thirds of an average.

Hampden (J. N. ISHAM).—Prospect for an average crop of Indian corn is good. Rowen crop will be a little short. Late potatoes promise to be above an average crop. Apparently a blight came upon most potatoes August 15, but I think it really was a premature or hasty ripening of the tops, for the early, medium late and late varieties ripened in their natural order, which would indicate no sweeping blight. Some very late varieties are still green. Dairy stock is in average condition and dairying has been a little more profitable than usual.

Brimfield (S. W. BROWN). — Outlook for Indian corn is good, but on account of drought the ears are not well filled out. Rowen will not be two-thirds of an average crop. Outlook for late potatoes is fair but drought has hurt them some. Have noticed very little blight or rot. Condition of dairy stock poor; feed has been too poor all summer. Dairying has been as profitable this year as usual. The drought has hurt the dairy badly. Pastures have been in worse condition than the mowings where we did not cut over two-thirds of a crop. Corn has made more than an average growth; more ears to the stalk than common but the ears are not well filled out.

WORCESTER COUNTY.

Warren (W. E. PATRICK). — Think the outlook for Indian corn is good for twenty-five per cent above an average season. Rowen will not be more than one-third of a crop. Late potato vines are looking well but fear the dry weather affected the setting. Noticed some cases of blight August 14. Some complaint of rot, but I do not think it is very extensive. On account of the severity of last winter, dairy stock came to the pastures looking thin; feed started very slowly, and has not been first class at any time. The last dry spell caused loss of flesh where grain has not been fed. While the price of dairy products has increased this season, grain has been so high and feed so short that it is very doubtful if dairying will be as profitable this year as usual.

New Braintree (C. D. SAGE). — Indian corn never looked better at this time of year. Rowen not up to the average; very little will be cut. Late potatoes promise a fair crop, but not so good as the early ones. Some blight was seen about August 10, but there is little rot as yet. Dairy stock is looking well, but there is general complaint of shrinkage of milk. Dairying has been much more profitable this year than last season. Cows have done fairly well and milk and butter have sold readily at fair prices, much better than last season.

Dana (E. A. ALBEE). — Indian corn promises a full average crop. Rowen will be an average crop. Outlook for late potatoes fair; early potatoes are rotting badly. A good many fields are blighted; appeared about August 1. Dairy stock is rather thin, owing to short pasturage. Dairying has not been as profitable this year as usual.

Templeton (LUCIEN GOVE). — Indian corn promises to be a fair average crop. August has been hot, with frequent light rains, and has pushed corn along rapidly, so its condition is much improved. Poor weather carried haying into the first half of the month. Rowen

will be rather below the average on account of light rains. Outlook for late potatoes very good. Have observed neither blight nor rot. Dairy stock is generally healthy and in fair condition as regards flesh. Dairying has been as profitable this year as usual. Blueberries and blackberries are a bountiful crop and sell readily in the local markets. Pears are a large crop. There is a fair crop of fall apples, but winter apples are very light. Beef sells better than a year ago. Grain is advancing in price.

Westminster (JOSEPH HAGER). — Outlook for Indian corn is very good. Rowen will be an average crop but later than usual. Outlook for late potatoes is excellent; nothing like it for years. Have observed neither blight nor rot. Dairy stock is looking about as usual. Dairying has not been as profitable this year as usual, on account of the high price of feed.

Bolton (H. E. BABCOCK). — Indian corn looks well but is late. There will be little rowen cut in this vicinity. Outlook for late potatoes is good but there is a good deal of complaint very recently of blight. Dairy stock is generally healthy but not in as good flesh as usual. Do not think dairying has been as profitable this year as last, as feed has been short and grain high, so farmers have not fed as much as usual.

Berlin (P. B. SOUTHWICK). — Indian corn is looking well and if the frost holds off there will be an average crop. Rowen will not be more than twenty-five per cent of an average. Outlook for late potatoes is very good. Noticed some indications of blight about the twentieth. Have noticed some rot. Condition of dairy stock about an average. Price of milk about the same as usual but butter is low and grain high and should say dairying has not been as profitable as usual. Although there is a heavy growth of foliage and it is still growing rapidly, fruit and vegetables seem to grow very slowly and should we have an early frost there will be great injury.

Spencer (H. H. KINGSBURY). — Outlook for Indian corn is very favorable. Haying on uplands was completed the first week in August and the very warm weather, with occasional showers, has started a fine second growth. Outlook for late potatoes is not good, owing to dry spells and risk of rot. Noticed both blight and rot August 8. Condition of dairy stock as good as usual, all in good health. Dairying has been as profitable this year as usual although there is at present a shortage of milk. Wild berries have been plenty. Blackberries still continue to ripen. Early apples plenty, but of poor quality. There will be a shortage of winter fruit. Pear trees are heavily loaded with fine fruit. Farm produce, except potatoes, will bring good prices this fall.

Douglas (G. M. WALLIS). — Corn promises to be a good crop ; ten per cent better than an average. Rowen will not be an average crop. Outlook for late potatoes good. Noticed blight August 12 ; if any, probably about five per cent of rot. Dairy stock is in good condition and looks well. Dairying has been about as profitable as usual in this vicinity.

MIDDLESEX COUNTY.

Sherborn (N. B. DOUGLAS). — Outlook for Indian corn is good. Another ten days of warm weather will mature it. Rowen will not be an average crop. Late potatoes are rotting badly. Dairy stock is not up to average years in condition, as grain has been too high. Think dairying has been as profitable this year as usual. The advance in price of dairy products about offsets the price of grain.

Concord (WM. H. HUNT). — Indian corn looks well but it is a little late. Rowen will be below an average crop. Late potatoes are rotting considerably. Noticed rot August 19 but potatoes may have commenced rotting before that date. Pastures are rather short and on account of the high price of grain farmers are not feeding as much as usual. Dairying not as profitable as usual this year. The price for nearly all truck products for August has been low. Blackberries on some days have sold as low as six cents per quart. Potatoes at \$1.50 per barrel. Bartlett pears at \$1.00 per bushel. The great abundance of peaches has hurt the sale of all kinds of fruit.

Littleton (GEO. W. SANDERSON). — Indian corn promises more than an average. Rowen will be an average crop. Outlook for late potatoes is good. Noticed a very slight blight about two weeks ago. Dairy stock is in very good condition. Dairying has been as profitable this year as usual. The dairy interests in this vicinity are principally devoted to the sale of milk.

Billerica (J. N. PARDEE). — Crop of Indian corn above the average but rather late. Rowen less than half an average crop. Do not hear of potatoes rotting badly. Dairy stock is generally in good condition. Do not think dairying has been as profitable this year as usual. The high price of grain, the low price of milk (twenty-two cents per can) and short pasturage, have conspired against our making an average quantity of milk. One farmer who ordinarily makes fifteen cans, dried and sent off to pasture every cow but one, and others have done so to some extent. Other farmers are keeping their cows up simply in hope that the present shortage of milk and reduction in the size of herds will force prices up after the first of October. Should present conditions

prevail there will be a large "slaughter" of all but the best cows, and were it not for valuable "waste products" in the manure cellar most of our herds would have gone to the block last spring.

Wilmington (C. W. SWAIN). — Indian corn promises to be a good crop. Rowen will be an average crop. Observed potato blight at different times about the middle of August; also considerable rot. Dairy stock is about in average condition. Should say dairying has been as profitable this year as usual. Plenty of fall apples but little demand for them. Winter apples almost a total failure. Pears in abundance and all other crops doing well.

ESSEX COUNTY.

North Andover (PETER HOLT, Jr.). — Indian corn will be an average crop. Rowen will be very light on account of dry weather. The outlook for late potatoes is good. Have seen no blight or rot. On account of short feed and high prices of grain the condition of dairy stock is hardly up to the average and milk is short. Dairying has not been as profitable this year as usual.

Haverhill (EBENEZER WEBSTER). — Indian corn does not promise quite an average on account of early cold and later drought. Rowen will not be an average crop with us. Outlook for late potatoes is fair if rot does not interfere. First noticed rot about the 12th of the present month. Some pieces are not affected. Dairy cows are not giving as much milk as usual, owing to drought. Excepting for the high price of grain dairying has been as profitable this year as usual.

Groveland (ABEL STICKNEY). — Outlook for Indian corn is good, and with a favorable September it will be more than an average crop. Late potatoes promise a good crop. Have neither seen nor heard of rot. Dairy stock looks well generally although pastures are dry and short. The rowen crop will be very small. At the usual time for cutting have not seen so little for years. A wet September may produce some.

Topsfield (B. P. PIKE). — Indian corn promises to be a full average crop. Rowen will not be an average crop. Late potatoes promise a large crop. Have not seen blight or rot. Dairy stock is looking and doing well. Light rains have kept the pastures green. Dairying has been fully as profitable this year as usual. Fall fruit and vegetables plenty. If the frost holds off there will be a large crop of cranberries.

Marblehead (W. S. PHILLIPS, Jr.). — No corn except sweet and ensilage grown here. Rowen will not be an average crop. Outlook for late potatoes very fair. First noticed blight July 17. Early potatoes seem to rot badly but late varieties do not seem to

have been injured as yet. General condition of dairy stock has been up to the average although within a week milking cows have shrunk in milk very much. Pastures need more moisture; at present many are only exercise grounds for the stock. Dairying has been just as profitable this year as usual. The season taken in all promises to be a fairly profitable one for the farmer.

NORFOLK COUNTY.

Weymouth (H. W. DYER). — The outlook for Indian corn is much better than usual. Rowen will be an average crop. The outlook for late potatoes is fair. Have not observed much potato blight. The general condition of dairy stock is good and I think that dairying has been as profitable this year as usual.

Avon (S. FRANK OLIVER). — Yield of Indian corn will be a little above the average. Rowen does not promise an average crop. Late potatoes are in excellent condition. Early potatoes show some signs of rot but late crops have not been affected. Condition of dairy stock good and dairying as profitable as usual. Fodder corn this year will be of a better quality and larger quantity per acre than for some years past. Although fall apples will be plenty Baldwins and Russets are a little poorer than usual.

Millis (E. F. RICHARDSON). — Indian corn promises to be a good crop. Rowen will not be an average crop. Outlook for late potatoes is good. Have observed neither blight nor rot. Dairy stock generally in good condition. Dairying has not been as profitable this year as usual.

Norfolk (J. W. HINKLEY). — Indian corn will be above an average crop. Rowen will not be an average crop. The outlook for late potatoes is good; noticed rot about August 15. General condition of dairy stock is very fair for milk producing. Dairying has not been as profitable this year as usual, on account of the cost of grain. The weather has been very favorable for reseeding grass land.

Franklin (C. M. ALLEN). — Indian corn is an average crop but backward. An early frost might damage it badly. Rowen will not be an average crop. Outlook for late potatoes is good. Very little blight or rot in this section. Dairy stock is not up to the average in condition. No profit in dairying this year. We produce all milk.

BRISTOL COUNTY.

Mansfield (D. E. HARDING). — The outlook for Indian corn is very good. Rowen will be more than an average crop. Late potatoes promise an unusually large crop; no blight or rot. The gen-

eral condition of dairy stock is good and I think that dairying has been as profitable this year as usual. Have not seen potatoes and vegetables so abundant for ten years. Trees are loaded with pears and all fruits except apples. Apples are not so plenty.

Swansey (F. G. ARNOLD). — Corn has suffered much from dry weather. Think it about two-thirds of a crop. Do not know of any rowen in town. Late potatoes are blighted and are a very light crop. Blight appeared the last week in July. There is some rot on low land. General condition of dairy stock is very good. Grain is so high and grass and water so scarce that milk costs about all it sells for. Dairying has not been as profitable this year as usual.

Dighton (A. W. PAUL). — Indian corn promises to be a very good crop. Rowen will not be an average crop. Outlook for late potatoes unusually good. Noticed a very little blight the last of July. Dairy stock about an average in condition. Dairying has not been as profitable this year as usual because of the high price of grain. Potatoes rule at about fifty cents per bushel. Tomatoes are rotting worse than usual, at least three-fourths being diseased with a black rot. This is a serious matter to our farmers who raise them largely for our canning factory. We are now having fine rains.

Berkley (R. H. BABBITT). — Think the corn crop will fall short of an average, owing to dry weather. Rowen is a failure here. Hardly any late potatoes are planted here. Have observed no blight but some fields seem to be badly affected with rot. The dry weather has caused the cows to fall off in milk rapidly of late, compelling farmers to feed from the barn as in winter. Do not think dairying has been as profitable this year as usual.

Westport (A. S. SHERMAN). — Outlook for Indian corn fair though it is somewhat injured by drought. Rowen crop almost a total failure. Outlook for late potatoes very good. Have observed very little rot. Dairy stock is looking well. Dairying has been as profitable this year as usual. The drought is doing a great deal of damage. There is scarcely any feed for cows, causing a small flow of milk, which is a serious matter to us as this is a milk producing vicinity and we do not sell butter or cheese.

PLYMOUTH COUNTY.

Lakeville (ELBRIDGE CUSHMAN). — The outlook for Indian corn is above that of the average season. Rowen will not be an average crop. There is general complaint that late potatoes are rotting. The rot commenced in most fields about August 15. Dairy stock is not up to the average in condition, pastures are short, and

fall feed not as good as was expected two weeks ago. Dairying has not been as profitable this year as usual.

Hanson (Dr. F. S. THOMAS). — Scarcely any Indian corn raised in town. Rowen will not be an average crop. Outlook for late potatoes is good. Noticed blight about the middle of August. Condition of dairy stock good. Think dairying has been as profitable this year as usual.

Marshfield (G. J. PETERSON). — Indian corn promises to be an average crop although it has been somewhat injured by drought. Rowen will not be an average crop. Crop of late potatoes is more than an average. Have observed no blight and very little rot. General condition of dairy stock is better than in former years.

Brockton (DAVIS COPELAND). — The outlook for Indian corn is good. Rowen will hardly be an average crop as a good deal of the first crop was cut late and it has been dry. Not many late potatoes raised in this section. Observed blight about the 8th of August. Most of the cows in this part of the State are kept by men who sell their milk and are fed grain and green fodder in the stable and are in good flesh. Dairying has not been as profitable this year as usual. The high price of grain, together with the shortness of the feed caused by the dry weather, has made it cost more than usual to make milk, while the price has been the same.

Wareham (A. SAVARY). — Indian corn will be almost an entire failure, owing to the excessive drought. No rowen crop except on very low land. Late potatoes do not promise to be so good a crop as the early planted. Have observed no blight or rot. Dairy stock is generally in good condition though suffering somewhat for want of pasturage. This year has been about an average for profit in dairying. The drought has been the most serious we have had in this vicinity for many years. Have had no rain of any consequence since April. Summer showers have passed on each side of this town. All late crops are an entire failure, with the exception of cranberries, which in this town, Carver and Plymouth, look well, better than further down on the Cape.

BARNSTABLE COUNTY.

Sandwich (J. R. HOLWAY). — Indian corn will not be over three-fifths of an average crop. There will be no rowen except on low meadows. Outlook for late potatoes good. Have observed blight on a few pieces, but little or no rot. Cows have shrunk in milk earlier in the season than usual and farmers have had to feed in the barn all summer. Dairying has not been as profitable this year as usual as pastures are short, grain high, and the price of butter

lower than usual. Potatoes are yielding unusually well and there is an outlook for a good crop of cranberries. The long drought has cut nearly all crops short and will hurt mowing in pastures for another year.

Dennis (JOSHUA CROWELL). — Indian corn promises to be an average yield, though but little is raised in this vicinity. Rowen will be very much less than an average crop. Outlook for late potatoes very good except for the very late varieties. Have observed no blight or rot. Think there is a falling off in the general condition of dairy stock. Dairying has probably been about as profitable as usual. We have been having a very severe drought in this vicinity. Pastures and grass lands suffered severely and cranberries to quite an extent. Copious showers fell on the night of the 26th.

Eastham (J. A. CLARK). — Outlook for Indian corn poor. Rowen will not be an average crop. There are not many late potatoes planted here. Have observed neither blight nor rot. Dairy stock is in fair condition. Think dairying has been as profitable this year as usual. The long drought of some seven weeks was broken the night of the 26th by copious rains. They will probably help corn and were a boon to the late turnip crop.

DUKES COUNTY.

West Tisbury (W. J. ROTCH). — Indian corn promises to be an average crop. Rowen will not be over two-thirds of an average crop. Outlook for late potatoes good. Have observed some potato rot, as high as twenty per cent in some cases. Noticed it as early as August 7. Dairy stock in average condition. Dairying has hardly been as profitable this year as usual, pasture feed being very short.

NANTUCKET COUNTY.

Nantucket (C. W. GARDNER). — Indian corn promises better than an average. Rowen will not be an average crop. Outlook for late potatoes is first rate. Noticed a little blight on several pieces about August 12. Condition of dairy stock good and dairying is rather on the increase with us. We are having a sharp drought now.

OLEOMARGARINE.

The national law has made the term "oleomargarine" apply to all forms of artificial butter or butter substitutes, and requires them to be stamped as such. By this law oleomargarine includes "all manufactured substances heretofore known as oleomargarine, oleo oil, oleomargarine oil, butterine, lardine, suine and neutral; all lard extracts and tallow extracts; all mixtures and compounds of tallow, beef, fat, suet, lard, lard oil, vegetable oils, etc.," so that each of these substances, either alone or in mixtures, is classed under the head of oleomargarine.

Early History.

In 1866-67* M. Mège-Mouries or Hippolyte Mège, at the solicitation of the French Government, was engaged in investigating several questions of domestic economy, and was invited to make experiments as to how far it was possible to manufacture a butter for the navy department and the poorer classes, which would be cheaper than butter and without any rancid taste.

The product he obtained was of a slightly yellow color, with a taste resembling neither tallow nor fat; and under the name of margarine was used extensively for kitchen purposes. He churned the melted fat with finely-chopped, fresh cow's udders, and to give the ordinary flavor of butter, milk or cream was added. He gave to the product the name of oleomargarine. On this process he took out a patent in England in 1869 and in the United States in 1873.

Mège had a factory at Poissy, near Paris, and manufactured oleomargarine for the markets of that city, and the Council of Health of the Department of the Seine admitted the new product as a legitimate food product, on condition that it should not be sold as butter.

* The date is also given as 1869.

History in the United States.

Oleomargarine was first made in the United States experimentally about the year 1870, in the laboratory of Prof. Chas. P. Chandler, at the School of Mines, Columbia College, New York City.

About the year 1873 a man by the name of Paraf started a company in New York, called the Oleomargarine Manufacturing Company. The process he used was like Mège's, but the material produced was a granular fat, with none of the odor or taste of butter; hence little was sold.

About the same time or a little later, the United States Dairy Company opened a factory in Brooklyn, N. Y., and Dr. Henry A. Mott, Jr., the chemist of the company, studied the Mège process and began a series of experiments to prevent the crystallization. He succeeded in manufacturing an article that closely resembled butter and the result of his experiments has been adopted by all the manufacturers. Prior to his discoveries the oleomargarine had a granular consistence, and not the smooth, even texture of butter.

After 1876 and 1877 many factories were established in different sections of the country, most of them employing Mott's process. About this time the Commercial Manufacturing Company began operations on a large scale in New York and at one time made 50,000 pounds of the substance daily, which it is stated found a ready sale at a price ranging from 15 to 22 cents per pound, according to the season and to the form in which it was put up. To make about 50,000 pounds of the substance a day it was necessary to treat 122,000 pounds of fat a night. This amount of fat would yield 41,882 pounds of oleomargarine, which, with 20 per cent added for milk and salt taken up, would make 50,258.5 pounds of the so-called butter at a cost of \$7,272.95, or at a rate of 14.4 cents per pound. This factory was closed soon after the enactment of the prohibitory law in New York.

The annual report of the New York Produce Exchange for 1889-90 states that the average price of oleomargarine at New York in 1886 was $6\frac{5}{16}$ to $6\frac{1}{2}$ cents per pound; in 1887, $6\frac{3}{8}$ to $6\frac{1}{2}$ cents per pound; in 1888, $7\frac{3}{4}$ to $7\frac{5}{16}$ cents per

pound; in 1889, $6\frac{2}{3}$ cents per pound. This would indicate that the cost of manufacture cannot be much over 6 cents per pound.

American Methods of Manufacture.

Although many patents have been granted for methods of manufacture, not one of them is in use to-day, and the manufacture of oleomargarine is open to any one who can command the capital necessary and who wishes to go into the business. The original Mège patent was bought by American capitalists, but only for the purpose of protecting themselves, and most of the processes now in use are not covered by the original patent.

* “The following ingredients enter into the manufacture of oleomargarine as pursued in this country: Oleo oil, neutral lard, some liquid vegetable oil, as cotton seed, ~~sesame~~, or peanut, butter, in the higher grades, cream and milk, together with salt, and annatto or other coloring material. Very few of the oleomargarine manufacturers make their own oleo oil or neutral lard, and none of them refine or crush the vegetable oils used in the lower grades of oleomargarine, but buy them in the open market, these materials being now well established commercial products.

The manufacture of oleo oil is generally carried on in connection with the large slaughter and packing houses situated in or near the principal cities, where every effort is made to utilize all portions of the cattle slaughtered. The finished product is nearly colorless, tasteless, and at ordinary temperature is a soft, granular fat, rather than an oil. The hard fat remaining in the filter bags is removed from the press and forms the beef- or oleo-stearin, which is used either for making refined lard, by the addition of cotton-seed oil, or sold to the soap or candle makers. The manufacture of neutral lard is conducted by essentially the same machinery and at about the same temperature employed in the manufacture of oleo oil. Only the leaf fat of freshly-slaughtered hogs is used.

Though there may be slight differences in the details, the range of temperature, size of tanks, etc., pursued by the dif-

* Annual report of the Commissioner of Internal Revenue. 1888.

ferent manufacturers, the general procedure is similar, the object being to obtain a neutral fat, melting at butter temperatures.

The butter used is always selected for its high flavor and taste and is generally obtained direct from the creamery. Owing to the granular character of oleo oil it becomes necessary to add some softer and smoother fat, and neutral lard and cotton-seed oil, or other similar vegetable oil, are added for the purpose of making the mixture more closely approach the consistency of butter. The proportions in which these ingredients are used vary with the seasons of the year, the grade desired, and the formulas of the manufacturers. The charge of milk or cream, however, is the same for all grades manufactured by any particular factory, and varies from 10 to 20 per cent. The milk or cream is allowed to become slightly sour. The whole is churned together from twenty to ninety minutes, the salt is then added and allowed to work itself in, which generally takes from twelve to twenty-four hours. The salted mass is then thoroughly worked by mechanical rollers to remove the buttermilk and water, following the general practice of creameries in this and subsequent operations of packing, etc.

Oleomargarine is placed on the market either "solid packed" or in prints or rolls. Four grades are generally made, known as "dairy" and "extra dairy oleomargarine," "creamery" and "extra creamery butterine," the last two containing from 10 to 25 per cent of the best creamery butter. In the lower grades, from 25 to 60 per cent of neutral lard, from 20 to 50 per cent of oleo oil, from 5 to 25 per cent of vegetable oils, and in some cases from 2 to 10 per cent of butter, with 10 to 20 per cent of milk or cream, are the proportions used. Some factories employ no vegetable oils in their oleomargarine, preferring to use a larger proportion of neutral lard, with a small amount of butter, to obtain the desired butter consistency. In the higher grades the proportions of oleo oil are reduced, the vegetable oils are discarded, and creamery butter is used to make up the charge."

*Production in the United States.**

The amount of oleomargarine produced in the United States during the eight months ended June 30, 1887, was 21,694,627 pounds; the amount produced during the fiscal year ended June 30, 1888, was 34,325,527 pounds; the amount produced during the fiscal year ended June 30, 1889, was 36,664,026 pounds, of which 18,523,172 pounds were produced in Illinois, 6,658,469 in Rhode Island, 4,126,393 in Indiana, and 561,143 in Massachusetts; the amount produced during the fiscal year ended June 30, 1890, was 32,324,032 pounds, of which 21,366,145 pounds were produced in Illinois, 4,764,581 in Rhode Island, 2,423,554 in Kansas, 1,769, 598 in Ohio, 1,076,667 in Pennsylvania, and 199,586 in Massachusetts. For the fiscal year ended June 30, 1890, the tax was paid on 30,960,286 pounds of oleomargarine, and for the fiscal year ended June 30, 1891, 43,574,422 pounds, or an increase of 12,614,136 pounds.

In the fiscal years 1887 and 1888 the largest production month was March, and in the fiscal year 1889, December; while the greatest production during the fiscal year ended June 30, 1890, occurred in October, the quantity produced during these months being as follows:—

In March, 1887,	3,568,254 pounds.
In March, 1888,	3,940,727 pounds.
In December, 1888,	4,181,317 pounds.
In October, 1889,	4,072,333 pounds.

The months in which the production fell below 2,000,000 pounds were May, June and July, 1887, June, 1889, and May, June, July and August, 1890, the production for July, 1887, being the smallest, viz., 1,208,638 pounds.

*Number of Persons in the Business and where Located.**

From the year 1877 to the end of 1886, when the national law went into effect, about 80 factories had been established. On the 1st of December, 1886, there were only 34 factories in the country, located as follows: in Colorado, 2; Illinois,

* Annual reports of the Commissioner of Internal Revenue.

10; Indiana, 1; Kansas, 1; Massachusetts, 1; New York, 6; Ohio, 4; and Rhode Island, 5. The number of persons in business during April, 1887, 1888, 1889 and 1890 was as follows:—

	1887.	1888.	1889.	1890.
Manufacturers,	32	29	23	21
Wholesale dealers, . . .	236	154	160	151
Retail dealers,	3,929	3,279	3,906	3,256
AGGREGATES,	4,197	3,462	4,089	3,428

Of the 21 manufacturers doing business in April, 1890, 1 was located in Denver, Col.; 3 in Providence, R. I.; 1 in Pawtucket, R. I.; 5 in Chicago, Ill.; 1 near Hammond, Ind.; 3 in Kansas City, Mo.; 1 in St. Louis, Mo.; 1 in Cambridge, Mass.; 1 in Columbus, O.; 1 in Cleveland, O.; and 3 in Philadelphia, Pa.

Of the 151 wholesale dealers doing business in April, 1890, 7 were in Providence, R. I.; 13 in Chicago, Ill.; 18 in Boston, Mass.; 7 in Detroit, Mich.; 6 in Pittsburg, Pa.; 4 in Indianapolis, Ind.; 4 in New Orleans, La.; 4 in Grand Rapids, Mich.; 4 in St. Louis, Mo.; 4 in Kansas City, Mo.; 4 in Jersey City, N. J.; 4 in Cincinnati, O.; and the rest scattering.

Of the 3,256 retail dealers doing business in April, 1890, 764 were in Illinois; 302 in Connecticut and Rhode Island; 400 in Massachusetts; 305 in Michigan; 266 in Missouri; 136 in Pennsylvania; and the rest scattering.

Oleomargarine in Massachusetts.

For the year ended June 30, 1888, 657,712 pounds of oleomargarine were produced in Massachusetts; the tax was paid on 655,330 pounds; 16,591 pounds were exported; and 7,138 pounds remained in the factory (Cambridge) at the close of the year. For the year ended June 30, 1889, 561,-

143 pounds were produced; the tax was paid on 515,595 pounds; 36,427 pounds were exported; and there remained in the factory at the close of the year, 16,259 pounds. For the fiscal year ended June 30, 1890, 199,586 pounds were produced; the tax was paid on 176,026 pounds; 26,454 pounds were exported; and there remained 13,365 pounds in the factory at the close of the year.

Upon inquiry at the office of the Collector of Internal Revenue, Boston, it was learned that there are now 15 wholesale dealers in oleomargarine in Massachusetts, of which number 10 are in Boston, 1 in Salem, 1 in Worcester, 1 in Gloucester, 1 in Lowell and 1 in Springfield; also 179 retail dealers, of which 57 are in Boston; 19 in Fall River; 14 in Somerville; 10 in Worcester; 9 in Cambridge; 8 in Lawrence; 5 in New Bedford; 4 in Lowell, and the remainder scattering.

According to the records of the Boston Chamber of Commerce the total receipts of oleomargarine for the year 1890 were 193,120 packages, which included tubs and boxes.

Estimating the packages to average thirty-five pounds apiece would make the receipts 6,759,200 pounds. Of this quantity 127,653 pounds were recorded as exported.

During the year 1886 the names of 583 dealers were registered in the office of the inspector of milk and vinegar of the city of Boston. In 1887 the number was 112. The large decrease is attributed to the effect of the United States revenue tax law imposing a tax of \$48 for retailers and \$480 for wholesalers. There was no evidence that the quantity of oleomargarine sold was less but the trade was in fewer hands. In 1888 118 dealers were registered, 12 holding United States wholesale tax receipts and 106 who paid a tax as retail dealers.

According to the thirtieth annual report of the inspector of milk and vinegar of the city of Boston, 1888, the total amount of oleomargarine sold in Boston by wholesalers, as ascertained by statements made by them, is 5,420,000 pounds. Of this amount 1,887,000 pounds are sold to retail dealers in Boston; the remainder to dealers in other cities and adjacent States. Of the amount sold to retail dealers in Boston 1,187,000 pounds are sold to private individuals, and 700,000

pounds, or a little more than one-third, are sold to boarding-houses and restaurants. The average price is 17 cents, large dealers selling at prices ranging from 15 to 18 cents, and smaller dealers selling as a rule at 20 cents per pound. The later reports of the inspector do not state the number of dealers or the amount sold.

Estimates of the Butter Industry.

The following estimates of butter are appended for comparison. According to the State census of 1885 nearly 10,000,000 pounds of butter were made in this State. During the year 1890 the thirty co-operative creameries in the State, most of which have been established since 1885, made a total of about 2,500,000 pounds. It is estimated that not less than 12,000,000 pounds of butter were made in this Commonwealth in 1890.

According to the annual report of the Boston Chamber of Commerce for 1890 the total receipts of butter in Boston for the year were 910,650 tubs and 205,957 boxes (estimated to be about 48,000,000 pounds), and the same year 1,805,102 pounds of butter were exported.

MASSACHUSETTS
CROP REPORT

FOR THE

MONTH OF SEPTEMBER, 1891.

COMPILED BY

WM. R. SESSIONS,
SECRETARY STATE BOARD OF AGRICULTURE.

BOSTON :
WRIGHT & POTTER PRINTING CO., STATE PRINTERS,
18 POST OFFICE SQUARE.
1891.

CROP REPORT FOR THE MONTH OF SEPTEMBER, 1891.

COMPILED FROM RETURNS TO THE OFFICE OF THE STATE BOARD OF
AGRICULTURE, SEPT. 29, 1891.

OFFICE STATE BOARD OF AGRICULTURE,
BOSTON, MASS., Oct. 3, 1891.

Bulletin No. 5, Crop Report for the month of September, is herewith presented.

For this issue blanks for returns were sent to one hundred and sixty correspondents, and one hundred and twenty-one were returned in season to be incorporated in the bulletin.

In the circular to correspondents returnable to this office September 29 the first question asked was, "Do you consider the crop of Indian corn a full average?" Of the one hundred and seventeen replies to this question, twenty-four state that the crop of Indian corn is above the average, eighty-one that it is a full average, and twelve that it is not a full average. The weather during the month of September was unusually favorable for the ripening of the crop. It is estimated that the crop will be 2,000,000 bushels, valued at \$1,500,000.

The second question asked was, "Are late potatoes an average crop in yield and quality?" Of the one hundred and sixteen replies to this question, twenty-two state that late potatoes are more than an average crop in yield and quality, eighty-two that the crop is an average, and twelve that it is below an average. But six correspondents refer to the rotting of potatoes. It is estimated that there were 4,000,000 bushels of potatoes grown in this State this season, valued at \$2,000,000.

The third question asked was, "Has the average amount of fall seeding been done, and what is its present condition?" In reply to this question, sixty-seven correspondents

answer yes, and thirty-five no. In general the dry weather the past six weeks has been unfavorable for the doing of this work. On low ground fall seeding is looking well, and some correspondents report it as being in excellent condition. Most of the correspondents state that rain is greatly needed.

The fourth question asked was, "Is the cranberry crop an average in yield and quality? If not, what were the drawbacks?" Of the forty-six replies to this question, thirty-one state the crop to be an average in yield and quality, and fifteen that it is not an average. Among the drawbacks are mentioned dry weather when in bloom, late frosts in the spring, and worms. Some report the berries to be small and not well colored, and that they have been slow in ripening.

The fifth question asked was, "When, in your opinion, was the abandonment of farm property in your locality the greatest, and why?" The answers to this question were quite varied, and samples of them may be found in the "Notes of Correspondents." It is difficult to make a summary of the replies as to the time when the abandonment was greatest. The dates given range from 1825 to the present time. Nearly all of them are between 1870 and 1890. The greater number centre about the year 1880. Among the causes given are: loss of young men by the civil war, emigration to the West, competition of Western farm products, unfitness of many farms for farming purposes, high price and poor quality of farm help, reaction in prices of farm products after the war, unequal taxation of farm property, better inducements in other lines of labor, city allurements, and shiftless farming.

The sixth question asked was, "Are inquiries for and values of farm property increasing or decreasing in your neighborhood?" Of the one hundred and thirteen replies to this question, fifty-eight state that inquiries for and values of farm property are increasing, forty-two that there has been no appreciable change, and thirteen that they are decreasing. An article upon the subject of abandoned farms in Massachusetts will be found printed at the end of the bulletin.

The tobacco crop has cured well, and much of it has been sold at unusually high prices. Squashes and celery are good crops.

Report No. 88 of the statistician of the United States Department of Agriculture gives the following figures of average condition of crops in Massachusetts Sept. 1, 1891: average condition of corn, 98; average condition of rye when harvested, 98; average condition of oats when harvested, 100; average condition of barley when harvested, 97; average condition of buckwheat, 99; average condition of potatoes, 97; average condition of tobacco, 99; average condition of apples, 71; average condition of grapes, 93; each product compared with an average, 72; number of stock hogs for fattening compared with last year, 97; average condition as to weight and size, 98.

CONDITION OF CROPS IN THIS SECTION.

FROM UNITED STATES WEATHER-CROP BULLETINS.

Week ending September 4. — New England: Crops ripening slowly. Potato rot not spreading seriously. Tobacco harvest nearly completed, and the crop is in good condition. A large crop of cranberries is indicated; picking will begin next week.

Week ending September 11. — New England: Light frosts on 8th and 9th in low lands; very little damage. Corn cutting begun, and the crop is above the average. Potato rot not increasing. Cranberry crop is estimated at slightly below the average.

Week ending September 18. — New England: Very favorable weather for ripening crops. Harvesting is going forward rapidly, with good results. The potato rot is not increasing.

Week ending September 25. — New England: The hot, dry weather has hastened the ripening of crops, and harvesting is well under way. Cranberries are excellent and grapes good. Rain needed; springs, streams and pastures drying up; too dry for fall seeding.

TEMPERATURE AND RAINFALL FOR THE WHOLE COUNTRY.

FROM UNITED STATES WEATHER-CROP BULLETINS.

Week ending September 4. — Week cooler than usual in all districts east of the Rocky Mountains, while to the westward and on the Pacific coast the excess in temperature above the normal for the week ranged from 3° to 6° . Frosts occurred from Wisconsin south-westward to Colorado. General deficiency in rainfall.

Week ending September 11. — Week cool generally over the country east of the Rocky Mountains. Light frosts occurred at extreme northern stations. Slightly warmer than usual in Minnesota, the Dakotas, and thence westward to the Pacific coast. Excess in rainfall generally along the Atlantic coast and at northern Rocky Mountain stations and on the Pacific coast. Very little rain in the central valleys.

Week ending September 18. — Warm week east of the Rocky Mountains. Temperature in excess over the whole country except California and portions of Oregon, Nevada, Utah and New Mexico. General deficiency in rainfall over the whole country east of the Rocky Mountains, with the exception of a few limited localities where local showers gave more than the normal rainfall. Rainfall in excess on the immediate Pacific coast.

Week ending September 25. — Over the region east of the Rocky Mountains, week warmer than the corresponding week of any previous year of which there is record in office of Weather Bureau. Week unusually dry throughout all agricultural regions east of the Mississippi, and generally over the lower Missouri and upper Mississippi valleys. Heavy rains occurred on the Texas coast, and generally throughout the Rocky Mountain regions. Drought conditions continue in New England and along the Atlantic coast.

MASSACHUSETTS WEATHER.

Meteorological Data for September, 1891.

STATION.	TEMPERATURE. DEG. F.					PRECIPITATION.		Prevailing Wind.	CLOUDINESS. NO. OF DAYS.		
	Mean.	Maximum.	Date.	Minimum.	Date.	Total in Inches.	Days with Precipitation.		Cloudy.	Partly Cloudy.	Cloudless.
Springfield, .	66.7	89	18	50	20	1.41	7	S.	7	15	8
Amherst, .	63.6	89	18	37	9	2.22	4	S. E.	9	14	7
Fitchburg*, .	63.6	86	18	50	30	1.87	8	W.	7	5	18
Princeton, .	68.6	85	18	42	14	2.43	6	W.	-	-	-
Dudley, .	65.0	86	21	46	9, 15	2.45	4	W.	8	15	7
Framingham, .	65.4	88	18	44	9	2.35	7	-	-	-	-
Concord, .	63.8	89	18	40	9	1.69	8	S. W.	6	9	15
Ipswich, .	65.8	90	18	44	9	1.34	4	N. W.	-	-	-
Boston, .	66.7	90	18	50	9	2.29	11	S. W.	6	6	18
Taunton, .	64.9	92	18	42	9, 20	2.39	7	N. W.	8	2	20
Middleboro', .	64.0	88	18	39	9	1.97	7	S. W.	5	13	12
New Bedford, .	65.4	86	18	44	9	1.97	9	-	-	-	-
Nantucket, .	65.3	77	6	56	15	3.12	7	S. W.	4	9	17

* Temperature data from thermometer not self-registering.

Summary.

Temperature (F.). — Monthly mean, 65.3°. Highest monthly mean, 68.6° at Princeton; lowest monthly mean, 63.6° at Amherst; maximum, 92° at Taunton on the 18th; minimum, 37° at Amherst on the 9th; range, 55°; greatest local monthly range, 52° at Amherst; least local monthly range, 21° at Nantucket; greatest daily range, 38° at Taunton on the 20th and 21st; least daily range, 3° at Boston on the 6th and 22d, at Ipswich on the 22d, at Middleborough on the 7th, and at Nantucket on the 30th. Average temperature for September at Springfield for twenty-four years, 63.0°; average for September, 1891, 66.7°; departure, +3.7°. Average temperature for September at Boston for twenty-one years, 62.4°; average for September, 1891, 66.7°; departure, +4.3°.

Precipitation. — Average, 2.72 inches; greatest, 3.12 at Nantucket; least, 1.34 at Ipswich. Average for September at Springfield for forty-four years, 3.55; for September, 1891, 1.41; departure, -2.14. Average for September at Boston for twenty-one years, 3.12; for September, 1891, 2.29; departure, -0.83.

Prevailing wind. — South-west.

Thunder-storms. — 6th, 13th, 14th, 29th.

Frost. — Taunton, 9th, 10th, 15th, 20th.

Auroras. — Amherst, Fitchburg, Ipswich, Taunton, 9th ; Amherst, 10th.

REMARKS.

The weather in Massachusetts for September, 1891, was characterized by an exceptionally high temperature, high barometric pressure, a decided excess of sunshine, a light wind movement, a small amount of cloudiness and number of rainy days, and a deficient rainfall.

The pressure was nearly one-tenth inch above the normal, and was due to the prevalence of anti-cyclonic or high-pressure fair weather areas as compared with the cyclonic or low-pressure areas. The temperature was from three to five degrees above the normal, with few excessive ranges or rapid changes. The mean temperature at New Bedford was 5.3° above the average of seventy-nine years. In the records at that station, September, 1819, 1822, 1826, 1846, 1865, and 1881, shows a higher mean temperature than was registered in September, 1891. The highest temperature occurred generally on the 18th under clear skies and with hot southerly winds. Slight frosts occurred in low lands on the 9th, doing little or no damage, but generally the night temperatures were unusually high.

The total precipitation was considerably below normal, although a few stations along the coast report a slight excess. The greater part of the rainfall for the month occurred in the storm of the 5th to 7th, when from two to three inches fell at many places in eastern Massachusetts. The western section received very little rain during that storm, consequently the least precipitation fell generally in the western part of the State. Only light local showers have occurred since that date, and a severe drought is being experienced. Springs and wells are giving out in many sections and streams are very low.

The observer for the New England Meteorological Society at Randolph, Mass., reports that strawberries and raspberries were picked on the 25th fully ripe, on vines that had already borne one crop.

NOTES OF CORRESPONDENTS.

(Mailed to us September 29.)

BERKSHIRE COUNTY.

Sandisfield (G. A. SHEPARD). Indian corn is a full average crop. Late potatoes are an average crop both in yield and quality. But little seeding has been done this fall, as it is a little too dry. The abandonment of farm property in this vicinity was greatest prior to our reimbursement by the State in 1882. The heavy debt this town had to carry in consequence of the money borrowed and expended in grading the contemplated Lee & New Haven Railroad caused many to strip their farms and then take what they could get for them, which caused a great depreciation of real estate and the abandonment of several farms. Inquiries for and values of farm property are increasing.

Sheffield (DWIGHT ANDREWS). — Indian corn is a full average crop. Late potatoes are an average crop both in yield and quality. The average amount of fall seeding has not been done. It is very dry, the dryest it has been at any time this season. The abandonment of farm property was greatest in this vicinity ten years ago, on account of the lack of farm help. I think that inquiries for and values of farm property are rather on the increase.

Becket (W. H. SNOW). — Indian corn is a full average crop, the hot weather of the last ten days saved it. Do not think late potatoes are up to the average in yield and quality. Do not think as much fall seeding as usual has been done, owing to the dry weather. I think there are as many abandoned farms at present as there have been. There have been some inquiries for farms and some sales have been made to city people.

Hancock (C. H. WELLS). — Indian corn is rather more than an average crop. Late potatoes are an average crop both in yield and quality. Very little fall seeding has been done. There has been no abandonment of farm property in this vicinity. Inquiries for and values of farm property are increasing.

Cheshire (L. J. NORMAN). — The crop of Indian corn is late, although it is a full average. Late potatoes are a fine crop, quality being extra. There is not much if any fall seeding in this

vicinity. The abandonment of farm property in this locality was greatest from fifteen to twenty years ago. My reason is that the people had very large families, and they found they could all find employment in manufacturing villages, and not a few of them now have good homes by so doing. Inquiries for and values of farm property are not increasing but seem to be at a standstill.

FRANKLIN COUNTY.

Monroe (D. H. SHERMAN). — Indian corn is a full average crop. Late potatoes are an average in yield, but are badly decayed. There have been but very few abandoned farms, and those are doubled in with neighboring farms, and all occupied. Inquiries for and values of farm property are slightly increasing.

Ashfield (A. G. HOWES). — Indian corn is above an average crop. Late potatoes are a full average both in yield and quality. Fall seeding is looking well. The abandonment of farm property in this vicinity has been greatest in the last ten years, owing to low prices of farm products and shiftless farming. I believe that farm values have touched bottom, and although prices have not perhaps increased, there is a better feeling among farmers, leading to improvement of land and buildings.

Northfield (CHARLES POMEROY). — Indian corn is a full average crop. Late potatoes are not an average crop in yield and quality. Fully the average amount of fall seeding has been done, and it is looking well. There are only five abandoned farms in this town. Farms are abandoned because people like to work in villages, where they can work in shops and mills and get paid weekly or monthly in cash. There has been an increased demand for abandoned farms at about the usual prices for the last few years.

Deerfield (CHARLES JONES). — Rowen is not an average crop, but has been secured in good condition. Corn is extra good and is ripening well. Late potatoes are of good quality, free from rot and fair in quantity. Fall seeding looks well, and more than usual has been done. Tobacco is an extra crop, has cured well and been sold to some extent at fair prices. The abandonment of farm property in this section was greatest from 1884 to 1889, owing to the low price of farm produce and the high price and scarcity of good farm help. To-day the outlook is better for farmers than for the past ten years. There are not many calls for farms, but some sales, and I think the calls and the prices are increasing.

Orange (ANSEL HARRINGTON). — Indian corn is more than an average crop. Late potatoes are more than an average both in yield and quality. Very little if any fall seeding has been done,

on account of the drought. The abandonment of farm property in this locality was greatest twenty years ago and more. I think that values of and inquiries for farm property are increasing. There are a great many causes for the abandonment of farms. The first and greatest was I think the loss of our young men by the civil war. Another reason is that there were a great many farms taken up that were never fit for anything but pasture and woodland. Still another is the high price and poor quality of farm help.

HAMPSHIRE COUNTY.

Pelham (J. L. BREWER). — Indian corn is a full average crop. Late potatoes are an average both in yield and quality. Fall seeding is not all completed yet, and needs rain badly. Cranberries are a short crop, being much injured by insects. The abandonment of farm property was greatest in this section from 1870 to 1880, on account of the sterility of the soil and antiquated methods of cultivation. There are no inquiries for farm property, and values are at a dead level.

North Hadley (H. C. RUSSELL). — Indian corn is a full average crop. Late potatoes yield well and are of good quality. The average amount of fall seeding has been done and is in good condition, although rain is needed now to insure a good stand for the approaching cold weather. There are no abandoned farms in town, and those that are for sale are held with more confidence in a higher market value than for a few years past. Inquiries for and values of farm property are increasing.

South Hadley (H. W. GAYLORD). — Indian corn is a full average crop. The average amount of fall seeding has been done and is looking fairly well, though some pieces are suffering for want of rain. More seeding has been done on wet, heavy soils than usual. Very few cranberries grown about here. No abandoned farms here in the general meaning of the term. If an owner leaves his farm, it is bought and occupied by one or more of the surrounding owners. There are no calls for or sales of farm property.

Northampton (D. A. HORROR). — Indian corn is a full average crop. Late potatoes are an average crop both in yield and quality. The average amount of fall seeding has been done, but unless we have rain soon it will suffer. The abandonment of farm property was greatest in this locality from 1880 to 1888. Inquiries for and values of farm property are increasing. Farms began to be abandoned when we commenced to get cheap or dressed meats from the far West.

Westhampton (W. H. LYMAN). — Indian corn is a full average crop. Late potatoes are an average crop both in quality and

quantity. The average amount of fall seeding has been done, and it is at present in fair condition. The abandonment of farm property in this section was greatest from thirty to fifty years ago, because of emigration to the West. Farmers are more enterprising at the present time, and are greatly improving their farms.

HAMPDEN COUNTY.

Blandford (E. W. BOISE). — Indian corn is fully ten per cent above an average crop. Late potatoes are above the average in yield, and of good quality. Very little fall seeding has been done, on account of the dry weather, and what has is in bad condition. The abandonment of farm property in this vicinity was greatest soon after the war, because of low prices for farm produce, high taxes and scarcity of reliable farm help. Inquiries for and values of farm property are increasing. Two farms have been sold this season, but at low prices compared with what they would have brought thirty years ago.

West Springfield (N. T. SMITH). — Indian corn is a full average crop. Late potatoes are above an average both in yield and quality. About the average amount of fall seeding has been done, but the continued dry weather causes slow growth. The only abandonment of farm property in this section is of outlying lands formerly used for pasturing or raising of rye and buckwheat. These lands have been allowed to grow up to brush on account of scarcity and high price of labor obliging the owners to concentrate their efforts on fewer acres. Most of this land is practically worthless, on account of frequent fires in the spring season, which prevent the growth of wood. A sale of these lands at their annual valuation for assessment of taxes would be impossible. Inquiries for and values of farm property are increasing.

Wilbraham (F. E. CLARK). — Indian corn is a full average crop. Late potatoes are not an average in yield, there being many small ones. The average amount of fall seeding has been done. Early seeded fields are looking finely, but late seeding is not, on account of the dry weather. The abandonment of farm property in this vicinity was greatest from 1880 to 1890. There are more calls at present for farm property than for several years previous.

Monson (A. H. WHITE). — Indian corn is a full average crop, both grain and stover. Some are husking, and find a very good yield. Late potatoes are an average crop both in yield and quality. I do not think the average amount of fall seeding has been done, but what has is looking very well. There is not much call for farms. We find on many farms fields that were formerly

cultivated but are now allowed to grow to wood, and pastures the same, the owners perhaps thinking this the most profitable, as good help is scarce and high.

Brimfield (S. W. BROWN). — Indian corn is the best crop we have had for ten years. Late potatoes are an average both in yield and quality. The average amount of fall seeding has not been done, and what has is not looking well. Abandonment of farm property commenced soon after 1874. Labor being high and produce not selling as in former years, war prices having made us extravagant, to make both ends meet we thought we must do something else to get more money. There are no inquiries for farm property, and we can hardly get a bid at public auction.

WORCESTER COUNTY.

Spencer (H. H. KINGSBURY). — Indian corn is a full average crop. Late potatoes are up to the average both in yield and quality. No fall seeding has been done thus far. No cultivated cranberries, but the wild ones are average in quantity but slow in ripening. I cannot give any particular time when the abandonment of farm property was greatest. Know of only two causes, — unproductiveness of soil, and old age or lack of energy on the owners' part. There is no change in the number of inquiries; values are firm, possibly on the rise, owing to the opening of the Worcester, Spencer & Leicester Electric Railroad.

Barre (J. L. SMITH). — Indian corn is a full average crop. Late potatoes are an average crop both in yield and quality. There has not been as much fall seeding as usual done, but it looks fairly well, although in need of rain. There are very few if any abandoned farms in this section. Quite a good many have no one living on them, but they are used for pasture for young cattle and for fattening beef. Most of them are some miles from railroads and on bad roads. Two or three years ago, when beef was low, most of them were only partly stocked, but this year I think they are all full of cattle. Inquiries for and values of farm property are increasing, and quite a number of farms have been sold to parties from Boston and other places within about a year.

Templeton (LUCIEN GOVE). — Indian corn is a better crop than usual. Late potatoes are a better crop in yield and quality than for the last four years. The average amount of fall seeding has been done, but it is below the average in condition, owing to drought. The abandonment of farm property was greatest in this section from 1875 to 1885. Reasons were, high taxes and low prices for products, and abandonment was usually preceded by fire. There is no perceptible change in the inquiries for and values of farm property.

Leominster (W. B. HOSMER). — Indian corn is a full average crop. Late potatoes are an average crop both in yield and quality. The average amount of fall seeding has been done, and, considering the dry weather and high temperature, it is looking well. A few farms in the outskirts of the town where the owners have died have been sold in lots, and are now owned by different individuals and mostly used as pasturing. Inquiries for and values of farm property are increasing, especially this season. Baldwin apples are large and fair, but the heavy foliage prevents their coloring.

Holden (G. S. GRAHAM). — Indian corn is more than an average crop. Large yield of late potatoes, but some rot. Not a large amount of fall seeding has been done in this section, but what has looks well. Should say that the abandonment of farm property was greatest in this section eight or ten years ago, because the outlook for farmers was the darkest then. Think there is more courage and hopefulness among the farmers than at any previous time.

Worcester (S. A. BURGESS). — The acreage, amount and quantity of the corn crop is considerably in excess of last year, and more than an average. Late potatoes are an average crop both in yield and quality. There has been less fall seeding this year than usual, and what there is needs rain badly. The abandonment of farm property was greatest in this locality from 1870 to 1880, because farm products depreciated in value and farm lands were unjustly taxed. Inquiries for and values of farm property are increasing.

Douglas (G. M. WALLIS). — Indian corn is a full average crop. Late potatoes are an average crop, both in yield and quality. From five to ten per cent more fall seeding than usual has been done, and it looks fine and healthy. Cranberries are not more than half a crop, owing to dry weather and worms. Farm property has changed hands to some extent in this vicinity, but it is all under good cultivation. There has been no particular change in the value of farm property for the last ten years.

Blackstone (L. R. DANIELS). — Indian corn is a full average crop. Late potatoes are more than an average in yield, but have rotted somewhat. The average amount of fall seeding has been done, and it is in fine condition. Cranberries are not quite an average crop, as worms, and frost in the latter part of May, damaged some meadows. The abandonment of farm property in this vicinity is the greatest at the present time, as farming is not as profitable as protected manufacturing. There has not been much change in the inquiries for and values of farm property for the last fifteen years. Farms will bring about two-thirds of what

they would have sold for previous to 1861. Not many farms are entirely deserted here, but large portions of nearly all farms have been allowed to grow up to brush and forest.

MIDDLESEX COUNTY.

Frammingham (H. S. WHITEMORE). — Indian corn is the best crop for several years. Late potatoes are not an average crop, owing to blight. Do not think the average amount of fall seeding has been done, owing to pressure of other work on the farms. Cranberries are not an average crop, owing to the dryness of the season. Farm property is not much in demand just now. Apples are a very light crop and poor in quality. Baldwins are a light crop, except in the orchard of Mr. John Moulton of Saxonville. His crop is excellent, of large size, very fair, and the trees are loaded and worth going miles to see.

Marlborough (E. D. HOWE). — Indian corn is a full average crop. Late potatoes are an average in yield and quantity. Little fall seeding has been done. No abandoned farms here. Very few changes are made except the owner dies, when the farm readily finds a purchaser. Our local market is good, and nearly all our farmers are comfortably well off. Taxes are high, but with a good market we do not complain.

Concord (W. H. HUNT). — Indian corn is a full average crop. Late potatoes are an average both in yield and quality. The usual amount of fall seeding has been done, and is in average condition. Farms near the village have increased in value. There are no artificial cranberry bogs in this vicinity. There are some natural bogs which bear when the conditions are favorable. I should say that the crop on such bogs was below the average.

Littleton (G. W. SANDERSON). — Indian corn is more than an average crop. Late potatoes are an average crop in both yield and quality. Do not think an average amount of fall seeding has been done. Dry weather has been a drawback. The cranberry crop will not be up to an average, on account of frosts in the spring. The abandonment of farm property in this section is now at its greatest. Inquiries for and values of farm property are not increasing.

Groton (DANIEL NEEDHAM). — Indian corn is a full average crop. Late potatoes are an average both in yield and quality. There has not been as much fall seeding as usual, on account of drought. Cranberries are an average in yield and quality. Inquiries for and values of farm property are rather increasing than otherwise. There are a few houses, built for farm-houses, that are in a very dilapidated condition, and not fit

for occupancy. No land that has been judiciously selected for a farm, upon which a house has been built, has been abandoned. The abandoned farms should never have been occupied, and it is to the credit of the good sense of the heirs that such farms are abandoned.

Lowell (C. L. MARSHALL). — Indian corn is a full average crop. Late potatoes are an average crop in yield and quality. As yet not much fall seeding has been done, but what has is in good condition. Cranberry crop very small in yield but quality excellent. At time of haying they were full in flower, but think dry weather injured them at that time. Inquiries for and values of farm property are slightly increasing.

ESSEX COUNTY.

North Andover (PETER HOLT, Jr.). — I think Indian corn is a little below the average. Late potatoes are above the average both in yield and quality. About the average amount of fall seeding has been done, but owing to the dry weather it makes a poor showing. Cranberries are all very small and not colored well; the drought has also affected them. There are a number of farms that are not operated, on account of the death of the owner, and widows and families still hold them. There is very little inquiry for farm property, and I think that values have not increased. I believe there are farms in this locality that can be purchased for less money than was paid for them within ten years.

Haverhill (EBEN WEBSTER). — Indian corn is a full average crop. Late potatoes are an average both in yield and quality. About the usual amount of fall seeding has been done, and it is up and looking well. No cultivated cranberries in this section, but a good crop of wild ones in the meadows. Small farms are changing hands occasionally, but values do not change much. We have had a long spell of hot and dry weather, which has ripened crops faster than usual.

Newbury (G. W. ADAMS). — Indian corn is a full average crop. Late potatoes are hardly up to the average, but are good. Perhaps as much fall seeding has been done as usual, but it is quite backward. The abandonment of farm property in this vicinity has been greatest during the last ten years, because there was no profit in farming. There are few inquiries for farm property; values of upland about the same, salt meadow low and growing lower.

Topsfield (B. P. PIKE). — Indian corn is a full average crop. Late potatoes are an average both in yield and quality. About an average amount of fall seeding has been done, and it is looking

well. The cranberry crop is up to the average in yield and quality. The abandonment of farm property in this vicinity has been the greatest during the past twenty years. I think one reason is the concentration of manufactures, and another the low prices of grain compared with labor. Inquiries for and values of farm property are about at a standstill. There are no sales of farms to actual farmers.

Marblehead (W. S. PHILLIPS, Jr.).—Indian corn is a full average crop. Late potatoes are fully up to the average both in yield and quality. Not much fall seeding has been done as yet, but what has is in prime condition. The abandonment of farm property in this vicinity was greatest about fifteen years ago, when a large area was put on the market for building purposes. Inquiries for and values of property for farm purposes are decreasing. Bountiful crops of most excellent quality have been secured, but prices are very low. Ensilage cutting is now going on, quality good, quantity above the average.

NORFOLK COUNTY.

Medfield (G. R. CHASE).—Indian corn is twenty-five per cent above a full average crop. Late potatoes are an average crop in yield and quality. The average amount of fall seeding has been done, and it is in excellent condition. The cranberry crop is more than an average in yield and quality. There are no abandoned farms in Medfield. Demand for farms light, but no change within a year. About the only farms for sale are offered because of death of male owner and survival of females or minors.

Franklin (C. M. ALLEN).—Indian corn is very nearly an average crop. Late potatoes are an average crop both in yield and quality. The average amount of fall seeding has been done, and is in average condition. The abandonment of farm property in this locality has been the greatest during the past five years, because it did not pay cost of crops. Inquiries for and values of farm property are decreasing. There are but few abandoned farms in this vicinity, but there are many that do not pay the cost of working and one per cent on the investment. Where there is no profit in a business, men abandon it and young men do not enter it.

Medway (MONROE MORSE).—Indian corn is somewhat less than an average. Late potatoes are more than an average in yield. Think that the cranberry crop is an average one. The abandonment of farms has been and is still going on to some extent, caused largely by changed methods of work, consequent upon the use of machinery, and also to some extent by the higher standard of

social life demanded by the farmers of to-day. All very rough farms must necessarily be discontinued for ordinary farming, and all very isolated ones ought to be for the good of the occupants. Good farms well situated are not abandoned in this vicinity.

Acron (S. F. OLIVER). — Indian corn is a full average crop. Late potatoes a good crop both in quantity and quality. The average amount of fall seeding has been done; winter rye has got a good start, and grass-land has got start enough to prevent its winter-killing. There are no cultivated cranberry bogs, but the natural bogs yield well. Inquiries for and values of farm property are increasing every year, and there is also a tendency to a higher valuation of taxable property. This winter will doubtless be a good one for the farmers, so far as having a good stock of vegetables on hand.

BRISTOL COUNTY.

Mansfield (D. E. HARDING). — Indian corn is a full average crop. Potatoes are more than an average crop. Fall seeding is in very good condition. There is a good yield of cranberries. There has been very little inquiry for farm property the present season. Our crops as a whole have been much more than an average. The potato crop has been especially large, and other vegetables have been abundant.

Dighton (A. W. PAUL). — Indian corn is more than an average crop. Late potatoes are a full average both in yield and quality. The average amount of fall seeding has been done, and is in fair condition. Few cranberries are raised here; yield is an average. The abandonment of farm property in this section has been continuous for years. I think ten places are for sale in Dighton now, while a few years ago there were none. Children born of American parents almost invariably abandon the farm in this vicinity. Fewer hours, more excitement and faster life are demanded.

Somerset (JOSEPH GIBBS). — Indian corn is about seventy-five per cent of an average crop. Late potatoes are an average crop in yield and quality. The custom of fall seeding is increasing in this vicinity, and the last of August is thought to be the best time. There have been no farms in this vicinity abandoned. Farms have sold readily when offered, and are not a drug in the market.

North Westport (A. S. SHERMAN). — Indian corn is a full average crop. Late potatoes are an average crop both in yield and quality. Very little fall seeding has been done on account of dry weather. Not many cranberries are raised in this vicinity. The abandonment of farm property is greatest at the present time. The reasons are that it costs so much to run a farm, crops are

uncertain, markets are full of farm produce and prices are low. In this town generally inquiries for and values of farm property are decreasing, although in this immediate neighborhood prices are held up because we are near the city.

PLYMOUTH COUNTY.

West Bridgewater (F. E. HOWARD). — Corn is not yet husked, but looks remarkably well, especially the stalks. The average amount of fall seeding has been done, but it needs rain. Cultivated cranberries are an average crop both in yield and quality, but native or uncultivated are a failure. Farms on the outskirts of the town far from any market are not now in demand, and the prices may be lower than formerly. But farms in the centre of the town or near Brockton market are increasing in value and will probably continue to increase. At the same time, our young people prefer to work in shoe shops rather than on the farm.

Halifax (G. W. HAYWARD). — Indian corn is a full average crop. Late potatoes are more than an average in yield and quality. More than the average amount of fall seeding has been done, and it is looking finely. Not many cranberries are raised in this town, but what there are are a good crop. In 1887 there were ten abandoned farms in this section, now there are none. I think that the inquiries for and values of farm property are increasing.

Marshfield (G. J. PETERSON). — Indian corn is a full average crop. Late potatoes are of fine quality and a good yield. About the average amount of fall seeding has been done. Along the south shore farm property has appreciated in value. Inquiries for and values of farm property are increasing, the exception is in the backwoods five or six miles away. Along the shore in my neighborhood there is not land enough for the demand. The margin near the salt water is narrow from Hingham to Plymouth. The development is quite marked within the last few years. The north shore is largely taken up, and the tendency now is southward.

Kingston (J. H. CUSHMAN). — Indian corn is only about two-thirds of a crop, owing to the drought. Late potatoes are more than an average in both quantity and quality. There has been but little seeding done compared to what there will be after the fall rains. The cranberry crop is an average one of very good quality. The abandonment of farm property in this vicinity was greatest about three years ago, because it did not pay to hire help. If there is any movement in inquiries for and values of farm property, it is in the direction of an increase.

BARNSTABLE COUNTY.

Falmouth (D. R. WICKS). — Indian corn is an extra crop. Late potatoes are below an average crop, owing to the drought. There is not much fall seeding done in this section. The cranberry crop as a whole is more than an average. Falmouth is a summer resort, and all the land is bought for that purpose. Values of farm property are increasing.

Sandwich (J. R. HOLWAY). — Indian corn is about two-thirds of an average crop. Late potatoes are the largest crop for several years and are of good quality. But very little fall seeding has been done, but that is looking well. Cranberries are a large crop on many bogs, but the berries are 'small, owing to dry weather. Inquiries for and values of farm property remain about the same.

Dennis (JOSHUA CROWELL). — Indian corn is a full average crop. Late potatoes are an average crop both in yield and quality. Very little fall seeding is done in this vicinity. I think the cranberry crop is an average one. Considering the amount invested in cranberry culture, values of farm property are increasing.

Eastham (J. A. CLARK). — Indian corn is not a full average crop. Late potatoes are an average crop both in yield and quality. Very little fall seeding is done here. The cranberry crop is fully an average both in yield and quality. Cannot say when the abandonment of farm property in this vicinity was greatest. Young people move away, old people die and the farms are deserted. Inquiries for and values of farm property are increasing.

DUKES COUNTY.

West Tisbury (W. J. ROTCH). — Acreage of Indian corn smaller than usual, but the crop is a full average. Late potatoes are an average both in yield and quality. Very little fall seeding has been done. Cranberry crop an average in yield and quality. The abandonment of farm property in this locality was never greater than now, because owners cannot do farming with sufficient profit. There is little change of late in farm values.

NANTUCKET COUNTY.

Nantucket (C. W. GARDNER). — Indian corn is a full average crop in every respect. Late potatoes are an average crop both in yield and quality. The average amount of fall seeding has not been done, on account of the dry weather. The cranberry crop is hardly one-tenth of an average crop, probably owing to the dry spell in June. The abandonment of farm property in this town was greatest about twenty years ago, on account of the business of the island being discontinued. Inquiries for and values of farm property are increasing to a slight degree.

ABANDONED FARMS IN MASSACHUSETTS.

Probably all readers of this bulletin are aware of the existence of abandoned farms in New England, and some may be familiar with the recent efforts of New Hampshire and Vermont to secure the reoccupancy of those within their borders. Such farms are also found in Massachusetts, and the Massachusetts Bureau of Statistics of Labor has collected a number of interesting statistics concerning them, which may be found in the twenty-first annual report of the said bureau (1890, pp. 177-258), from which the following extracts are made.

The returns as to abandoned farms were made directly to the bureau by the assessors of the several towns at the close of the year 1889 and early in the year 1890.

The following definition of the term "abandoned farm" was placed upon the blank sent out to the assessors : —

"By 'Abandoned Farms' in this inquiry are meant those formerly cultivated but now deserted, upon which cultivation is now abandoned, and the buildings, if any, unoccupied and permitted to fall into decay. In some cases the grass is still cut on these farms, but nothing is done in the way of enrichment of the soil, and the land is practically unproductive and left to run wild."

The returns were made in accordance with this explanation, which describes what is generally understood by the term abandoned farm, and the following statistical tables, so far as they refer to such farms, are limited by the definition given : —

THE STATE AND COUNTIES.	NUMBER.		
	Farms with Buildings.	Farms without Buildings.	Total.
THE STATE,	772	689	1,461
Berkshire,	120	92	212
Franklin,	113	116	229
Hampshire,	92	124	216
Hampden,	101	112	213
Worcester,	187	157	344
Middlesex,	52	24	76
Essex,	2	—	2
Suffolk,	—	—	—
Norfolk,	25	11	36
Bristol,	33	19	52
Plymouth,	24	31	55
Barnstable,	13	2	15
Dukes,	10	1	11
Nantucket,	—	—	—

The following table shows the comparative acreage and value of all farms and abandoned farms, with percentages : —

THE STATE AND COUNTIES.	Acreage of all Farms in 1885.	Acreage of Abandoned Farms in 1890.	Percentages of Acreage of Abandoned Farms of acreage of all Farms.	Value of all Farm Land in 1885.	Assessed Value of Abandoned Farms in 1890.	Percentages of Assessed Value of Abandoned Farms of Value of all Farm Land.
THE STATE, .	3,661,833 ³ _{9.3}	126,509 ¹ ₄	3.45	\$93,803,077	\$1,076,328	1.15
Berkshire, .	547,689 ³ _{4.4}	27,397	5.00	10,221,355	130,745	1.28
Franklin, .	383,756 ¹ _{9.8}	18,776	4.89	6,428,883	117,434	1.83
Hampshire, .	316,442	21,672	6.85	5,800,379	132,072	2.28
Hampden, .	300,736 ¹ _{9.1}	16,836	5.60	6,183,261	116,343	1.88
Worcester, .	798,890 ¹ _{9.1}	29,117 ¹ ₁₂	3.64	17,222,883	314,731	1.83
Middlesex, .	406,533	4,870 ¹ ₄	1.20	17,989,032	117,795	0.65
Essex, .	193,999 ¹ ₁₂	114	0.06	8,814,938	2,910	0.03
Suffolk, .	1,783 ³ _{4.3}	—	—	628,950	—	—
Norfolk, .	160,756 ³ _{4.4}	1,987	1.24	7,464,743	44,195	0.59
Bristol, .	200,653 ³ _{8.3}	2,221 ¹ ₂	1.11	5,598,848	40,865	0.73
Plymouth, .	216,118 ¹ ₁₂	2,407	1.11	5,180,840	41,268	0.80
Barnstable, .	84,344	466	0.55	1,657,313	11,050	0.67
Dukes, .	41,805	645	1.54	487,424	6,920	1.42
Nantucket, .	8,325	—	—	124,228	—	—

In the following summary the bureau recapitulates the salient points brought out by the investigation.

Abandoned farm land in Massachusetts is principally confined to the western counties. Such land aggregates 3.45 per cent of the total farm acreage of the State, outside the limits of cities, and about 0.87 per cent of the value of such farm land. In Nantucket and Suffolk counties no abandoned farm land is returned. The percentage of acreage of abandoned farm land of total farm acreage, for the counties returning abandoned farm land, is highest in Hampshire County, reaching therein 6.85 per cent. It is lowest in Essex County, being therein only 0.06 per cent.

The average size of abandoned farms with buildings is 86 acres, and for those without buildings 87 acres. The average value of abandoned farms with buildings is \$894, and for those without buildings \$561. The average value of buildings on abandoned farms is \$337 per farm, ranging much less than the average value of buildings upon farms under cultivation. Much of the abandoned land may be bought for less than \$10 per acre.

While some of the towns containing abandoned farms show a recent decline in the value of agricultural products and property, this is not universally true, and the decline in certain localities is overbalanced by increase in others in the same county, so that, notwithstanding the existence of abandoned farms, each county, except Nantucket, shows an increase since 1875 in the value of agricultural products, and every county shows an increase in the value of agricultural property. In some counties, also, an increase in the acreage of land under cultivation appears.

Except in Barnstable and Dukes counties, the towns reporting abandoned farms show an aggregate increase in population since 1865; and, except in Barnstable, Dukes and Franklin counties, an increase since 1855. The increase is not usually so great, however, as appears in the other towns in the counties respectively. In the towns containing abandoned farms, and having no important manufacturing industries, a decline in population generally appears. The exception is in Middlesex and Norfolk counties, in which, however, the proportion of abandoned farm land is small.

For two years or more this office has been anxious to do something to call attention to such farms in Massachusetts, and, if possible, to get them into the market. The last Legislature granted the necessary authority and appropriation to make at least a beginning, and shortly afterwards the executive committee of the board met and instructed the

secretary to go forward with the work. Acting under their direction the following circular was sent to the boards of assessors of each of the several cities and towns in the Commonwealth : —

COMMONWEALTH OF MASSACHUSETTS.

STATE BOARD OF AGRICULTURE, SECRETARY'S OFFICE,
COMMONWEALTH BUILDING, BOSTON, June 16, 1891.

To the Assessors of Massachusetts.

GENTLEMEN :—The following law has been enacted by the Legislature : —

[CHAP. 280.]

AN ACT TO AUTHORIZE THE STATE BOARD OF AGRICULTURE TO COLLECT AND CIRCULATE INFORMATION RELATING TO ABANDONED FARMS.

Be it enacted, etc., as follows :

SECTION 1. The State Board of Agriculture is hereby authorized to collect all necessary information in regard to the opportunities for developing the agricultural resources of the Commonwealth through the repopulating of abandoned or partially abandoned farms, and cause the facts obtained, and a statement of the advantages offered, to be circulated where and in such manner as the said board may consider for the best interests of the Commonwealth.

SECT. 2. In order to properly carry out the provisions of section one of this act, a sum not exceeding two thousand dollars may be expended, and the bills for such expenditures properly approved by the persons authorized by said State board to investigate the matter, shall be sent to the auditor of the Commonwealth, who shall certify them in the same manner as other claims against the Commonwealth.

SECT. 3. This act shall take effect upon its passage.

Approved May 4, 1891..

The object is to make known opportunities for the purchase, at a low price, of farms in Massachusetts. You will of course notice that the law does not require you to assist in the work, but it is believed that you will be interested in a scheme which has for its end the prosperity of your towns, and will be willing to help the Board of Agriculture in gathering information that can be spread before the public to the advantage of the owners of abandoned and partially abandoned farms, and of would-be purchasers.

The towns which contain such farms will be benefited by having them owned and improved by persons residing upon them. The plan of action is not yet fully matured ; but, without question, the first thing to be done is to get a list and description of such farms.

As the assessors are better acquainted with such lands and their owners than are any other citizens, we apply to you for information. The law makes it our duty to obtain information and circulate the same in regard to abandoned or partially abandoned farms in the Commonwealth.

We must leave it largely to your judgment to interpret the phrase "partially abandoned farms," but would suggest that a farm which is not occupied for purposes of cultivation or a summer home, and is for sale at a low price, might be called an abandoned or partially abandoned farm.

It will of course be of little use to call attention to farms that have been so long abandoned that the buildings have disappeared and the land mostly grown up to brush and wood, but sizable tracts of land suitable for purposes of cultivation or for grazing, though without buildings, should be considered. It will also be of little use to call attention to farms that are not on the market for what would be called a low price in proportion to their productive capacity.

Will you kindly write in the enclosed blank the names and post-office addresses of the owners of such farms, in your town, as may seem to you to come within the meaning of the law. We shall issue a circular of inquiry for particular description, location, price, etc., to the owners whose names you may furnish us. We will keep you informed of the progress of the work and shall very likely need your further aid. Any suggestions will be gladly received and considered.

In order that the necessary information from the owners may be seasonably obtained it will be necessary that this blank be returned before July 1, 1891. If you have no farms that seem to you to come within the meaning of the law, please return the blank with such remarks thereon as will describe the situation in your town.

THE MASSACHUSETTS STATE BOARD OF AGRICULTURE,
WM. R. SESSIONS, *Secretary*.

The following table gives the number of abandoned or partially abandoned farms by counties as reported by the assessors of the several cities and towns in response to the circular letter; number of cities and towns in each county, and the number reporting abandoned or partially abandoned farms:—

COUNTIES.	No. of Cities and Towns in County.	No. Reporting Abandoned or Partially Abandoned Farms.	No. of Abandoned or Partially Abandoned Farms Reported.
Berkshire,	32	16	138
Franklin,	26	18	110
Hampshire,	23	11	86
Hampden,	22	9	83
Worcester,	59	30	253
Middlesex,	54	17	50
Essex,	35	2	9
Suffolk,	4	—	—
Norfolk,	27	8	36
Bristol,	20	7	50
Plymouth,	27	9	33
Barnstable,	15	3	26
Dukes,	6	2	8
Nantucket,	1	1	6
Aggregates,	351	132	888

Returns have not been received from the towns of Clarksburg, Dartmouth, Cummington, Goshen, Needham, Scituate, and Hubbardston.

The work was continued by the sending of the following circular letter to the owners or agents of the abandoned or partially abandoned farms reported by the assessors : —

COMMONWEALTH OF MASSACHUSETTS.

STATE BOARD OF AGRICULTURE, SECRETARY'S OFFICE,
COMMONWEALTH BUILDING, BOSTON, Aug. 25, 1891.

To the Owners of Abandoned or Partially Abandoned Farms in Massachusetts.

GENTLEMEN : — The Legislature at its last session enacted the following law : —

(See page 24, chapter 280, sections 1, 2, 3.)

In discharge of the duty devolving upon the Board of Agriculture under the provisions of this statute, a circular has been addressed to the assessors of the several cities and towns of the State asking them to report to this board the names of the owners of abandoned or partially abandoned farms. Your name has been reported by the assessors of ——— as the owner of such property. If you desire to dispose of the property please answer the following questions in regard to the same,

subscribe to the affidavit below before a justice of the peace and forward it in the enclosed envelope. This description and affidavit will be retained in this office for reference. A catalogue of such farms with description and price will be printed and widely distributed. There will be no expense to the owners of the property. Please be prompt in replying, as nothing further can be done by us until all information has been received.

THE MASSACHUSETTS STATE BOARD OF AGRICULTURE,

WM. R. SESSIONS, *Secretary.*

REPORT OF ABANDONED OR PARTIALLY ABANDONED FARM.

Located in the town of.	Is the barn in good repair?
Total acreage.	What kind of fences and in what condition?
Acres of mowing land.	What is the water supply?
Acres in pasturage.	Number of apple trees.
Acres in woodland.	Number of other fruit trees.
Acres suitable for cultivation.	Name of nearest railroad station and distance from farm.
Can grass be cut with a machine?	Name of nearest post-office and distance from farm
Is there a sugar bush? Number of trees.	Price at which farm will be sold.
Size of house, if any.	Amount required in cash.
Size of ell.	The balance can remain on mortgage at what rate of interest?
Number of rooms.	State any facts of interest.
Is house in good repair?	
Size of barn, if any.	
Is there a barn cellar?	

I hereby certify that the above statements in regard to the farm owned by me in the town of _____ are true to my best knowledge and belief, and that any time within one year of the date hereof I will sell said farm for the price and on terms named, unless previously disposed of.

Owner or Agent.

Date _____

P. O. Address _____

Before me,

Justice of the Peace.

Although but about one month has elapsed since the second circular was sent out, 177 replies have been received. Of these replies, 127 are filled out in a complete and satisfactory manner; 16 are properly filled out, but are not sworn to; 25 state that the assessors were misinformed, 5 that the farm has been sold, and 4 that the owner or agent does not care to sell. Forty-six letters have been returned by the post-office department as unclaimed.

We have depended upon the judgment of the assessors of the several towns to decide as to what farms shall be classed as abandoned or partially abandoned. No doubt there has been considerable variation in the standard adopted in different towns. In some towns farms have been reported that should not have been, while in others some have been omitted that properly belong in the list. As it will be some weeks before the catalogue can be issued there will be time for amendment of the list. It is the earnest desire of the Board of Agriculture that this work may be full and complete, and that every part of the State may be fairly treated. To this end correspondence is invited from interested individuals throughout the State. The attention of such individuals is called to the language of the circular addressed to the assessors and printed on pages 24 and 25.

When the replies to the second circular are received it is proposed to issue a preliminary catalogue, which we hope to do during the autumn. Many requests for such a catalogue have already been received, and among them are requests from parties in the States of Massachusetts, New Hampshire, Rhode Island, Connecticut, New York, New Jersey, Pennsylvania, Virginia, North Carolina, Ohio, Indiana, Illinois, Michigan, Kansas, Nebraska, California, Alabama, Texas, Washington, D. C., and one from Montreal, Canada.

MASSACHUSETTS
CROP REPORT

FOR THE

MONTH OF OCTOBER, 1891.

COMPILED BY

WM. R. SESSIONS,
SECRETARY STATE BOARD OF AGRICULTURE.

BOSTON:

WRIGHT & POTTER PRINTING CO., STATE PRINTERS,
18 POST OFFICE SQUARE.

1891.

CROP REPORT FOR THE MONTH OF OCTOBER, 1891.

COMPILED FROM RETURNS TO THE OFFICE OF THE STATE BOARD OF
AGRICULTURE, OCT. 29, 1891.

OFFICE STATE BOARD OF AGRICULTURE,
BOSTON, MASS., NOV. 3, 1891.

Bulletin No. 6, Crop Report for the month of October, is herewith presented. This will constitute the last issue of the season, and it is desired to extend to correspondents sincere thanks for the interest they have shown and for the manner in which they have made their returns from time to time.

It is hoped this work, which is voluntary on the part of this office, may be continued another year. The issue of these monthly bulletins began in June, 1888, and for the first number about four hundred copies were printed. Five bulletins were issued in 1888, six in 1889, six in 1890, and six in 1891. For September, 1891, 2,400 copies of the Bulletin were printed and distributed. The bulletin for June, 1888, contained 13 printed pages, while each bulletin this year has contained 28 pages.

The special subjects treated this season have been as follows: Bulletin No. 1, Tuberculosis; Bulletin No. 2, The Gypsy Moth; Bulletin No. 3, Yields and Values per Acre of Crops in Massachusetts as compared with Other States; Bulletin No. 4, Oleomargarine; Bulletin No. 5, Abandoned Farms in Massachusetts.

Two pages on Massachusetts weather, prepared by an expert, have been included in each bulletin; and since Bulletin No. 2 (June) a weekly statement of condition of crops in this section and of temperature and rainfall for the whole country, from the United States Weather-Crop Bulletins, has been included in each issue. Since the same date an abstract of the monthly reports of the statistician of the United States Department of Agriculture of the condition of crops in Massachusetts at the beginning of each month has also been included.

It is desired to call attention to chapter 196 of the Acts of 1890, as amended by chapter 49 of the Acts of 1891. As amended, the law is as follows : —

SECTION 1. The mayor and aldermen of the cities and the selectmen of the towns within the Commonwealth are hereby authorized to designate and preserve, as hereinafter provided in this act, trees within the limits of the highways for the purposes of ornament and shade ; and to so designate not less than one such tree in every thirty-three feet where such trees are growing and are of a diameter of one inch or more.

SECT. 2. Said mayor and aldermen and selectmen shall, between the first day of September and the thirty-first day of December in each year, designate such trees as are selected by them for the purposes set forth in this act by driving into the same, at a point not less than four nor more than six feet from the ground and on the side toward the centre of the highway, a nail or spike with a head with the letter M plainly impressed upon it ; said nails and spikes to be procured and furnished by the secretary of the state board of agriculture to said mayor and aldermen and selectmen as required by them for the purposes of this act. Said mayor and aldermen and selectmen, between the first day of September and the thirty-first day of December of each succeeding year, shall renew such of said nails and spikes as shall have been destroyed or defaced ; and shall also designate, in the same manner as hereinbefore stated, such other trees as in their judgment should be so designated to carry out the requirements of this act.

SECT. 3. Whoever wantonly injures, defaces or destroys any tree thus designated, or any of said nails or spikes affixed to such trees, shall forfeit not less than five nor more than one hundred dollars, to be recovered by complaint, one-half to the complainant and one-half to the use of the town wherein the offence was committed.

SECT. 4. This act shall not apply to ornamental or shade trees whose preservation is now provided for by chapter fifty-four of the Public Statutes and the acts amendatory thereof.

The requisite nails or spikes have been procured by the secretary of the Board of Agriculture, and he is prepared to furnish them, on request of selectmen of towns or mayor and aldermen of cities, for the purposes set forth in the act above mentioned.

MASSACHUSETTS WEATHER SINCE JAN. 1, 1891.

In January and February there was an excess of temperature, precipitation and cloudy weather. In March there was also an excess of temperature and precipitation, but the number of rainy days was below the average and there was an excess of sunshine. At the end of March the spring was considered to be from a week to ten days ahead of the average. April was warm and dry and the sunshine was in excess. The snowfall of the winter was slightly in excess. A heavy thunder-storm occurred in south-eastern Massachusetts on the evening of February 28.

At Amherst ice began to be harvested in good condition in December. Sleighing was good pretty much all winter. On the evening of February 28 snow-squalls were accompanied with frequent flashes of lightning. On the 2d and 3d of April a storm gave eleven inches of snow, lasting only a few days.

The weather for May was cold and dry, with a small number of rainy days and a slight excess of sunshine. The mean temperature was only slightly below the normal, but there were several extensive and severe frosts, the temperature on several mornings going below the freezing point of water. Ice formed, and ground froze to the depth of one inch in places, on the 4th. On the 19th frost was especially severe except on the immediate coast. Light snow-squalls occurred in sections on the 6th.

The precipitation at seven stations in Massachusetts having records for more than ten years was 1.37 inches below the average.

Although the average temperature and total precipitation during June varied very little from the normal, the extremes of heat and cold and of drought and moisture were well marked. Hot, muggy weather and heavy rains with thunder-storm occurred on the 2d and night of the 3d. The temperature fell rapidly on the 4th, under the influence of cool, north-westerly winds, reaching the minimum for the month on the evening of the 5th. A general frost occurred on that morning, though its evil effects were somewhat checked by a thick fog that spread over most low lands. From the 5th

to the 16th the weather was generally fair, with only an occasional trace of rain on the 12th, and with steadily increasing temperature from day to day. On the 16th the temperature reached nearly 100° , except at Nantucket. This degree of heat is almost unprecedented so early in the month. The drying winds that prevailed helped to make the drought very severe. The temperature fell rapidly on the 17th, and copious rains fell till the 23d, being particularly heavy on the 22d. Threatening weather, with occasional rain and low temperature, continued till the end of the month. On the 26th a thunder-storm moved easterly over southern New England, accompanied in the Connecticut valley by considerable hail.

The weather for the month of July was cool and wet, with an excess of cloudy and rainy days. Both the maximum and minimum temperatures were somewhat below the figures generally recorded, the latter unusually so. On the morning of the 28th the mercury ran down to within less than ten degrees of the freezing point of water. At Springfield the mean for the month (69.6°) was the lowest July mean recorded during a period of twenty-four years, covering from 1868 to 1891. At Fitchburg, where there is a series of observations beginning in 1857, the years 1860, 1865 and 1884 only show a July mean lower than the present, the lowest being 66.6° in 1860, just one degree lower than in 1891. The records at the weather service office in Boston show lower July means in 1881, 1884 and 1888, the lowest being in 1884, and also just one degree lower than in 1891. At Thompson, Conn., where observations for nearly half a century have been made, and with a thermometer that has hung in nearly the same position during all that time, the mean was the lowest, with one exception, ever recorded. That was in 1859, when the mean was 64.9° , less than one-half degree lower than in 1891.

The precipitation was generally heaviest and the number of rainy days greatest in the Connecticut valley, while the least precipitation fell over that section between the Connecticut valley and the coast region. Thunder-storms were not frequent or unusually severe. Hail fell at Cheshire on the 20th, during the progress of a thunder-storm.

The mean temperature for the month of August, at those stations in Massachusetts having records for more than ten years, was slightly above the normal, being somewhat in contrast with the month of July in this respect. The days of highest temperature were the 10th, 11th and 12th. The maximum was several degrees lower than was experienced in June (an unusual fact), and occurred on the 11th, except along the coast, where a well-defined sea-breeze was felt. The minimum temperature occurred generally on the morning of the 1st, but it was very cool on the 3d, 20th and the last three days of the month.

The number of cloudy and rainy days was in excess, except at Nantucket and a few other local sections, but the precipitation was nearly one inch below the average. The thunder-storms were neither frequent nor unusually heavy.

The weather for September was characterized by an exceptionally high temperature, high barometric pressure, a decided excess of sunshine, a light wind movement, a small amount of cloudiness and number of rainy days, and a deficient rainfall.

The pressure was nearly one-tenth inch above the normal. The temperature was from three to five degrees above the normal, with few excessive ranges or rapid changes. The mean temperature at New Bedford was 5.3° above the average of seventy-nine years. In the records at that station, September, 1819, 1822, 1826, 1846, 1865, and 1881, show a higher mean temperature than was registered in September, 1891. The highest temperature occurred generally on the 18th, under clear skies and with hot southerly winds. Slight frosts occurred in low lands on the 9th, doing little or no damage, but generally the night temperatures were unusually high.

The total precipitation was considerably below normal, although a few stations along the coast reported a slight excess. The greater part of the rainfall for the month occurred in the storm of the 5th to 7th. The western section received very little rain during that storm, consequently the least precipitation was generally in the western part of the State.

MASSACHUSETTS WEATHER.
Meteorological Data for October, 1891.

STATION.	TEMPERATURE. DEG. F.					PRECIPITATION.		Prevailing Wind.	CLOUDINESS. NO. OF DAYS.		
	Mean.	Maximum.	Date.	Minimum.	Date.	Total in Inches.	Days with Precipitation.		Cloudy.	Partly Cloudy.	Cloudless.
Springfield, .	50.3	85	4	26	29	3.39	7	N.W.	7	20	4
Amherst, .	48.2	87	4	21	29	2.56	6	N.E.	13	12	6
Royalston, .	49.6	80	4	28	29	2.50	3	N	15	5	11
Fitchburg,* .	47.4	82	4	22	29	3.73	10	N.W.	8	11	12
Dudley, .	50.2	84	3, 4	23	29	2.96	8	W.	11	14	6
Framingham,	48.6	84	4	26	29	3.70	11	—	—	—	—
Concord, .	47.9	87	4	18	29	3.16	12	S.W.	17	5	9
Ipswich, .	51.0	85	3	22	29	4.85	9	N.W.	13	14	4
Boston, .	51.6	83	3	28	29	5.56	11	N.W.	13	8	10
Taunton, .	50.8	91	4	23	29	5.80	10	N.W.	—	—	—
Middleboro',	49.4	83	4	19	29	5.70	12	N.W.	11	13	7
Provincet'n.,	51.9	74	4	33	29	5.82	9	—	—	—	—

* Temperature data from thermometer not self-registering.

Summary.

Temperature (F.). — Monthly mean, 49.7°. Highest monthly mean, 51.9° at Provincetown; lowest monthly mean, 47.4° at Fitchburg; maximum, 91° at Taunton on the 4th; minimum, 18° at Concord on the 29th; range, 73°; greatest local monthly range, 69° at Concord; least local monthly range, 41° at Provincetown; greatest daily range, 40° at Middleborough and Taunton on the 2d; least daily range, 2° at Ipswich on the 12th and 20th and at Royalston on the 24th. Average temperature for October at Springfield for twenty-four years, 50.7°; average for October, 1891, 50.3°; departure, —0.4°. Average temperature for October at Boston for twenty-one years, 51.6°; average for October, 1891, 51.6°; departure, 0.0°.

Precipitation. — Average, 4.14 inches; greatest, 5.82 at Provincetown; least, 2.50 at Royalston. Average for October at Springfield for forty-four years, 4.20; for October, 1891, 3.39; departure, —0.81. Average for October at Boston for twenty-one years, 4.19; for October, 1891, 5.56; departure, +1.37.

Prevailing wind. — North-west.

Thunder-storms. — Dudley, 7th; Amherst, 20th; Middleborough, 26th.

Solar Halos. — Royalston, 25th.

Lunar Halos. — Royalston, 10th, 11th; Dudley, 16th, 17th.

Aurora. — Concord, 28th.

REMARKS.

The weather for Massachusetts for October was characterized by a normal pressure, excessive precipitation on the coast, high wind velocities and extremes of heat and cold. A correspondent from Randolph writes: "Strawberry short-cake from berries picked in the open air, snakes, lightning, frost and snow, make a month of delightful irregularity." The areas of high and low pressure were generally well marked and followed each other in rapid succession across or near New England, giving, with the attendant winds, that marked influence on our weather that is so characteristic of New England falls and winters. On the 4th, under generally clear skies and warm southerly winds, as a cyclone was passing down the St. Lawrence valley, a maximum temperature of from 80° to 90° was experienced; again, after the passage of a cyclonic area across northern New England on the 26th, a large anticyclone spread slowly eastward and under its influence the temperature fell steadily through the 27th, and with only a slight rise on the 28th, to a very low minimum on the morning of the 29th. The first hard frost of the season occurred at many places on that morning, although light frosts were numerous during the entire month.

Four West India hurricanes reached our coast during the month, giving dangerous gales and causing considerable damage to our shipping. The storm of the 23d, which evidently originated over the Ohio valley and then moved to our southern coast, gave a very early snow-storm. In many places, where no hard frosts had been felt, the full-leaved trees loaded with snow, the many flowers in the gardens, looking up through their white blanket, and the

unpicked Baldwin apples showing among the snow-covered branches, — all presented an unusual sight.

The precipitation was considerably above the normal in the eastern and slightly below in the western section. At Cotuit, the total rainfall for the month was 10.14 inches, 5.46 inches more than the normal for the month. A wind velocity of 40 miles an hour was registered at Boston on the 23d.

CROPS OF THE YEAR.

The general opinion of correspondents the first of June seemed to be that the month opened under less favorable conditions, agriculturally speaking, than it did last year. The month of April was quite favorable. The month of May was decidedly cool and wet, with occasional frosts, which did considerable damage to fruit and early crops in many sections. The correspondents were about evenly divided as to the future outlook. Almost every correspondent reported the presence of the tent caterpillar, and that steps had been taken by many farmers to destroy the pest, while others did nothing. Nearly all the correspondents reported first-class farm help as quite difficult to obtain, and that \$20 to \$25 per month and board was a fair average of the wages paid such help.

The 1st of July it was believed that on the whole the season compared favorably with last season. The opinion was general that Indian corn was looking very well, though much of it was backward on account of cool, dry weather; and that the acreage was larger than last year. Haying had very generally commenced, but grass was late and the weather had been unfavorable for curing, so that little had been secured. The hay crop promised to be considerably less than the crop of last year. Early potatoes were looking very well, and the acreage was estimated to be considerably greater than last year. The general opinion seemed to be that dairy products had been a little less in quantity, of about the same quality and with a little better price than last year. Generally speaking, the outlook for small fruits was good. The strawberry crop was hardly over two-thirds of an average. Blackberries, raspberries and grapes promised good crops.

August 1 most of the correspondents reported the hay crop as being entirely secured. The crop was estimated to be about three-fourths of an average. The quality as a whole was stated to be excellent. The prospect was that rowen would not be an average crop, owing to lack of rain and lateness of cutting of much of the first crop. The general opinion was that the crop of fall apples would be large, while the crop of winter varieties would be considerably below the average. The opinion was expressed that on the whole the yield of small fruits was slightly below the average, while prices were a full average. The quality was generally good. Early potatoes had been generally harvested, and most correspondents reported a good yield of good quality. A few cases of blight and rot were reported. Rye was reported as generally satisfactory both in quality and quantity. Pastures had been injured by lack of rain. The peach crop promised to be larger than usual. Cranberries promised well. The pear crop was reported as good. The tobacco crop promised to be an unusually good one. Indian corn was looking well, though backward. On the whole, the condition August 1 was favorable, and the season so far fairly prosperous for the farmer.

September 1 40 correspondents stated the crop of Indian corn promised to be an average; 37, above an average; 34, a good one; and 10, below an average. Fully three-fourths of the correspondents stated that rowen did not promise to be an average crop. Of 97 replies to the question, "What is the outlook for late potatoes?" 53 stated it to be good; 20, excellent; 13, fair; 7, not very good; and 4, light. Nearly all the correspondents stated that they had observed either blight or rot. Most reported the condition of dairy stock as being either excellent, good or average. A number reported that there had been a shrinkage in the amount of milk. To the question, "Has dairying been as profitable this year as usual?" 72 correspondents answered yes; 39, no; and 10 stated it to have been more profitable. The chief drawbacks had been shortness of pasture feed and high price of grain. Of the 70 direct replies to the question, "Do you think the dairy interests of the State are seriously affected by the manufacture and sale of oleomargarine?" 56

were yes, and 14, no. A portion of the tobacco crop had been harvested in good condition, and considerable had already been sold at unusually high prices. Celery, squashes and tomatoes promised to be good crops. The pear crop was reported to be very large.

October 1 24 correspondents stated the crop of Indian corn to be above an average; 81, a full average; and 12, below an average. Practically the same figures illustrated the yield and quality of the crop of late potatoes. Sixty-seven correspondents stated that the average amount of fall seeding had been done, and 35 that it had not, owing to dry weather. Forty-six correspondents reported the cranberry crop to be an average in yield and quality, and 31 that it was not. Drawbacks mentioned were dry weather while in bloom, late frosts, and worms. Tobacco had cured well. Of 113 replies to the question, "Are inquiries for and values of farm property increasing or decreasing in your neighborhood?" 58 noted an increase; 42, no appreciable change; and 13, a decrease.

Report No. 89 of the Statistician of the United States Department of Agriculture gives the following figures of yield per acre and condition of crops, Oct. 1, 1891; average yield of wheat per acre in 1891, 16.7 bushels; average yield of rye per acre in 1891, 15.3 bushels; average yield of oats per acre in 1891, 33 bushels; average yield of barley per acre in 1891, 26.7 bushels; average condition of buckwheat October 1, 95; average condition of corn October 1, 99; average condition of potatoes October 1, 97; average condition of tobacco October 1, 99.

In the circular to correspondents returnable to this office October 29 the first question asked was, "Have root crops done as well this year as usual?" Of the 114 replies to this question, 88 answer yes; 13, no; and 13 state that they have done better than usual. Several correspondents report root crops to have been injured by drought, and several that turnips have turned black in the field and are of small size.

The second question asked was, "Which of the leading crops of your locality do you think have been least profitable this year?" and the third question asked was, "Which of the leading crops of your locality do you think have been

most profitable?" Fifty-seven correspondents state corn to be among the most profitable crops this year, and 5 state it to be among the least profitable; for potatoes, 23 most profitable and 37 least profitable; for hay, 24 most profitable and 27 least profitable; for apples, 5 most profitable and 19 least profitable; for tobacco, 13 most profitable; for pears, 7 least profitable; for rye, 2 most profitable; for oats, 5 most profitable and 1 least profitable; for onions, 6 most profitable and 2 least profitable. A number of other crops are referred to by one or two correspondents as being among the most or least profitable crops.

The fourth question asked was, "Considered as a whole, has the season been a profitable one for your farmers?" Of the 116 replies to this question, 80 state it to have been a profitable one; 12, that it has been an average season; 6, that it has been a fairly prosperous season; 9, that it has been more prosperous than usual; and 9, that it has not been a profitable season.

The fifth question asked was, "Do you think farmers anticipate an increase of prosperity in their business in the near future?" Of the direct replies to this question, 79 correspondents state that they do think that farmers anticipate an increase of prosperity in their business in the near future, and 20 that they do not think so. It is estimated by the "New England Homestead" that the farmers in the Housatonic and Connecticut valleys alone will receive at least \$1,400,000 more for their tobacco crop than they did last year, an increase of over eighty-seven per cent.

NOTES OF CORRESPONDENTS.

(Returned to us October 29.)

BERKSHIRE COUNTY.

Sandisfield (G. A. SHEPARD). — Root crops have done as well as usual this year. Potatoes have been our least profitable crop, for, although we had an abundant crop of good quality, the market for them is not brisk and there are but few sales. Grass is our leading and most profitable crop every year. Of the other crops, corn takes the lead this year, the growth being heavy and well matured. Buckwheat has done remarkably well, but is raised only by a few. Considered as a whole, this season has been more profitable than the average of seasons. There is a difference of opinion among farmers. Many anticipate and all hope for an increase of prosperity.

Sheffield (DWIGHT ANDREWS). — Root crops have not done quite as well as usual this year, on account of the dry weather. Apples have been the least profitable of any of our leading crops and corn the most profitable. Considered as a whole, the season has been a profitable one for farmers, and they have no reason to complain. I think that farmers anticipate an increase of prosperity in their business in the near future.

Alford (H. W. SMITH). — Root crops have not done as well as usual this year, on account of drought. Potatoes have been the least profitable of the leading crops in this locality. Hay, rye, oats and corn have been the most profitable. Considered as a whole, the season has been a profitable one for our farmers. I think that farmers anticipate an increase of prosperity in the near future.

Lee (A. BRADLEY). — Very few roots raised here. The hay crop has been the least profitable of any of the leading crops in this locality. Fodder crops have been the most profitable of any. Considered as a whole, the season has been a profitable one for our farmers, and I think they anticipate an increase of prosperity in their business.

Dalton (W. B. BARTON). — Root crops have not done quite as well as usual this year, it having been a little too dry. The apple crop has been so large that it has kept prices down to about the

cost of marketing. All crops have yielded abundantly, there has been excellent weather to secure them, and I think the farmers are improving their stock as well as their lands. I also notice more repairs on farm buildings than usual, and in fact everything points to prosperity. I think that, as a whole, the season has been a profitable one for our farmers.

Windsor (H. A. FORD). — Root crops have done as well as usual this year. Potatoes have rotted quite badly and bring a low price. Buckwheat and corn have been our most profitable crops. Considered as a whole, the season has been a profitable one for our farmers, the dairy having been better than for several years.

Cheshire (L. J. NORTHUP). — Root crops, with the exception of turnips, have been unusually good. Turnips were a good yield, but upon cutting them most of them were found to be black. Corn has been the most profitable of our leading crops and turnips the least so. The season as a whole is considered to be a profitable one for farmers. I think farming in the future will be as profitable as in the past, and perhaps more so.

Hancock (C. H. WELLS). — Root crops have done as well as usual this year. Potatoes have been the least profitable and corn the most so of our leading crops. The season has been a fairly profitable one for farmers. I think that farmers anticipate an increase of prosperity in the near future.

Williamstown (S. A. HICKOX). — Root crops have done as well as usual this year. Potatoes have been the least profitable of any of our leading crops, having rotted to some extent and the prices having ruled low. Grass has been our most profitable crop. Considered as a whole, the season has been a profitable one for our farmers, and they anticipate an increase of prosperity in the near future.

FRANKLIN COUNTY.

Monroe (D. H. SHERMAN). — I think that root crops have done as well as usual this year. There are considerable quantities of turnips, beets and carrots raised for feeding in this section. Apples have been the least profitable of our leading crops, because of low prices. Potatoes have been the most profitable, yielding well and selling readily at fifty cents per bushel. The season has been about an average one for farmers. Think that farmers may anticipate an increase of prosperity in their business, as lumber, timber and wood are in good demand.

Charlemont (H. S. GILES). — Root crops have been very good this year. The crop for successful farming is hay, with which we have been highly favored this year. The corn crop has been

one of the best, and is a very profitable crop for the farmer. Some of our farmers have sold their tobacco for twenty-five cents a pound, and feel that it pays well. Apples are very large and nice, with a larger crop than was expected. Potatoes are very good, with a large yield. Considered as a whole, the season has been a profitable one for our farmers. Farmers anticipate an increase of prosperity in the near future.

Buckland (J. D. AVERY). — Potatoes have been the least profitable of any of our leading crops this year, on account of low prices. Corn has been the most profitable, the crop being exceedingly heavy and of the best quality. I should judge that the season has been an average one for profit to the farmer. Although farmers are not looking for a big boom in their business, they are more cheerful and there is less complaint of hard times.

Colrain (A. A. SMITH). — Root crops have done as well as usual this year. Corn and tobacco have been the most profitable of the leading crops in this section. Considered as a whole, the season has been a profitable one for farmers. I think they anticipate an increase of prosperity in the near future.

Bernardston (R. H. CUSHMAN). — I do not think that root crops, especially turnips, have done as well as usual this year. Potatoes have been low in price, but the crop was large. Corn is unusually good, as are nearly all crops. Considered as a whole, the season has been a profitable one for farmers. I think that farmers anticipate an increase of prosperity in their business in the near future.

Whately (FRANK DICKINSON). — Root crops have done as well as usual this year. All crops have done well except hay, which is short with little increase in value. Tobacco is the leading crop and is also the most profitable. Considered as a whole, the season has been a profitable one for our farmers, and they anticipate an increase of prosperity in the near future.

Montague (C. S. RAYMOND). — I think that root crops have done as well as usual this year. Potatoes have been the least profitable of our leading crops, and tobacco the most so. The season has been a profitable one for farmers. Crops have been abundant this year, and I think farmers are well satisfied with crops and prices. There seems to be a great supply of potatoes and the price is fair, but the demand is not equal to the supply. Tobacco is a good crop with ready sale at paying prices. I think that farmers anticipate an increase of prosperity in the near future.

Northfield (CHARLES POMEROY). — Roots are a full average crop this year. I cannot tell which crop has been the least profitable; all crops were unusually good. Tobacco and corn have been the

most profitable. Considered as a whole, the season has been the most profitable we have had for ten years. Our farmers have great hopes for increased prosperity in the future.

HAMPSHIRE COUNTY.

Belchertown (H. C. WEST).—Root crops have done as well as usual this year. It is hard to say which of the leading crops has been the most profitable in this vicinity, all being remarkably good both in quantity and quality. This season has been a profitable one for our farmers. They have had good crops, a good season for harvesting, and fair prices. For years the farmers have not been so hopeful as they are to-day. There never was a time, in my opinion, when the prospects of the farmer were brighter or the old farm more of a prize.

Amherst (C. E. WILSON).—Root crops have done as well as usual this year. Potatoes have been the least profitable and tobacco the most so of any of our leading crops. Considered as a whole, the season has been a profitable one for farmers. I think that farmers anticipate an increase of prosperity in their business in the near future.

Hadley (L. W. WEST).—Root crops have done as well as usual this year. Tobacco has been the most profitable of our leading crops. The yield of all crops except hay has been good. The yield of potatoes has been large, but the price is low. Corn has been remarkably good, and there appears to be no soft corn. Considered as a whole, the season has been a profitable one for our farmers. Most of them hope for an increase of prosperity in the near future.

Northampton (D. A. HORTON).—Root crops have done very well this year. Potatoes have been the least profitable of our leading crops, at an average price of fifty cents per bushel. Tobacco has been the most profitable crop this year. The season has been a profitable one for our farmers, and everything points to an increase of prosperity in the near future.

Chesterfield (HORATIO BISBEE).—I think root crops have done as well as usual this year. The potato crop is the only crop that has not paid very well. The hay crop, although a light one, pays as well as any crop here. I think this season has been as profitable as any in the last few years. Farmers think they have touched bottom, and are looking for something better in the near future. Apples are more plenty than was anticipated, and are of very good quality.

Goshen (ALVAN BARRUS). — Root crops have done as well as usual this year, although they are somewhat variable as to yield and disease. I might say that potatoes have been the least profitable of our leading crops, although apples are hardly satisfactory in price. However, the man who keeps good apples late will win in price, there being an excess of fall fruit. Corn has probably been the most profitable of our leading crops. There does seem to be a feeling of more confidence in the business than there has been in the past.

Worthington (C. K. BREWSTER). — Root crops have done about as well as usual this year. Oats have been the least profitable of our leading crops. Grass has been the most profitable and corn the next. More good corn has been harvested than for years. Butter is high for the season and in ready demand, and on the whole the outlook for farmers is encouraging. Considered as a whole, the season has been a profitable one for the farmers, and they look forward to an increase of prosperity in the near future.

HAMPDEN COUNTY.

Russell (ROLAND PARKS). — I think root crops have done as well as usual this year. Hay has been the least profitable and potatoes the most so of any of our leading crops. Considered as a whole, the season has been a profitable one for our farmers. I think that they anticipate an increase of prosperity in the near future.

West Springfield (T. A. ROGERS). — Roots are a full average this year. The crop we have to handle the most of for the money we get is fruit. The corn crop has been as profitable as any this year, unless it is tobacco. The season has been an average one for profit to the farmer. I think there is a strong feeling that there will be an increase of prosperity for the farmer in the near future.

Holyoke (J. C. THORPE). — Root crops have done as well as usual this year. Hay has been the least profitable of our leading crops. Corn has been the most profitable, especially that used for silage. The production of milk is the chief occupation of the farmers in this locality, and hence a great deal of corn is raised for silos and hay for rotation feeding, together with vegetables and roots for market. The season has been about an average one for profit. Farmers do not anticipate an increase of prosperity in the near future.

Chicopee (R. W. BEMIS). — Root crops have done better than usual this year. All crops except potatoes have done well this

season. Corn has been the most profitable. The season has been a profitable one for our farmers both in quantity and quality of crops. I think that farmers anticipate an increase of prosperity in their business in the near future.

Hampden (J. N. ISLAM). — Root crops have done better than usual. The short crop of hay was not followed by an advance of price, hence it was the least profitable of our leading crops. Corn, oats and apples, with dairying, have been the most profitable. Considered as a whole, the season has been a profitable one for farmers. Farmers anticipate an increase of prosperity in the near future. Most crops bring better prices than last year. Potatoes are not as high, but the more abundant crop brings better returns per acre than usual. Scientific principles are creeping into farm practice, bringing more sure profits.

Wilbraham (H. M. BLISS). — Root crops have done as well as usual this year. Potatoes have been the least profitable of our leading crops, and corn and grass the most so. Considered as a whole, the season has been a profitable one for our farmers. I think that farmers anticipate an increase of prosperity in their business in the near future.

Brimfield (S. W. BROWN). — Root crops have done as well as usual this year. Grass has been the least profitable of the leading crops in this locality. Corn has been the most profitable. The season, as a whole, has been a profitable one for farmers, and they anticipate an increase of prosperity in their business. The average crops have been good, and sales to a larger extent than usual satisfactory.

WORCESTER COUNTY.

New Braintree (C. D. SAGE). — Root crops have done better than for several years. Potatoes have been the least profitable of our leading crops. Grass has been the most profitable, and corn comes next. The past season has been a prosperous one. All crops were good, with the exception of hay, which was more than a three-fourths crop. Dairy products are selling well, and farmers are more encouraged, and will plan to raise more and better crops and increase their business generally.

Rutland (A. L. MILES). — Root crops have done very well this year. Apples have been our least profitable crop, and hay, corn and potatoes our most profitable ones. I think that the season as a whole has been a profitable one for our farmers. It seems to be the general opinion among farmers that there will be an increase of prosperity in their business in the near future. The cold snaps of the last few weeks have found many apples unpicked, but they

are apparently not yet seriously injured. The fall feed has been very good. Many farmers are suffering from lack of water in wells, and unless rains come soon the prospects for winter will be serious. One farmer here raised sixty bushels of marketable popcorn on three-fourths of an acre.

Dana (E. A. ALBEE). — Root crops have done as well as usual this year. Potatoes and grass have been the least profitable of our leading crops. Corn, rye and oats have been the most profitable. Considered as a whole, the season has not been a profitable one for our farmers. Farmers do not anticipate an increase of prosperity until our tax laws are so changed as to make the burden more equal between the agriculturist and the capitalist.

Templeton (LUCIEN GOVE). — Root crops have done as well as usual this year. Perhaps the quantity may not have been so large, but the quality is excellent. Apples and potatoes have been the least profitable of any of our leading crops; hay, corn and early vegetables have been the most so. Taking into consideration all crops, the season has been the most profitable for three years. I think that, as a whole, the farmers anticipate brighter times. Corn was harvested in excellent condition. Potatoes good, price low. Fair quantity of winter apples at two dollars per barrel. Native beef very cheap, and cows low. Pork has declined in price. Fall seeding is looking better than it did last month.

Westminster (JOSEPH HAGER). — Root crops have done as well as usual this year. Apples and pears have been the least profitable and roots the most so of any of our leading crops. Considered as a whole, the season has been the best we have had for several years. I do not think that farmers anticipate any increase of prosperity in the near future.

Leominster (W. B. HOSMER). — Root crops have generally done as well as usual this year. The pear crop has been the least profitable this season. Hay, corn and apples have been the most profitable, but all crops have done well except pears. The harvesting season is now about over, and farmers in this section find they have been blessed with a bountiful yield, with but few exceptions. As farming is better understood with the aid of the experiments through the State and other sources, it is conducted more in a business-like manner. This interests and encourages farmers so that now to be successful they must study and not guess, and from this the farmers anticipate increased prosperity.

Lancaster (S. C. DAMON). — Root crops have done as well as usual this year. Milk has been the least profitable of any of our produce. Small fruits have been our most profitable crop. Considered as a whole, the season has been a profitable one for our

farmers. I do not think that farmers anticipate any increase of prosperity in the near future.

Harvard (PRESTON KNIGHT). — Think that root crops have done as well as usual this year. Cucumbers and squashes have been the least profitable of any of our leading crops. Small fruits have been the most profitable. The season has been a fairly profitable one for our farmers. Think it is doubtful whether farmers anticipate any increase of prosperity in the near future; the outlook is not very promising as yet. Wells and springs are dry or getting pretty low. Fall feed is very good. Apples in large supply, prices not very satisfactory. Corn very good, and nearly all fall crops generally good.

Boylston (I. A. DUNN). — Root crops have done as well as usual this year. Hay has been the least profitable and corn the most so of our leading crops. Considered as a whole, the season has been a profitable one for our farmers. I think that farmers anticipate an increase of prosperity in their business in the near future.

Worcester (H. R. KINNEY). — Root crops have done as well as usual this year. Apples have been the least profitable and corn and potatoes the most so of our leading crops. Considered as a whole, the season has been a profitable one for farmers. Hoed crops have done very well this year, and the farmers who cultivate considerable land feel very well satisfied, but those who depend on hay and buy all their grain are complaining. The outlook is good for those near the cities or live towns. Apples are poor and only a few of them. Pears have been a full crop but have sold very low.

Douglas (A. E. RAWSON). — Root crops are more than an average this year. The apple crop was the least profitable, being a small yield and the fruit very inferior. Corn has been the most profitable; there has been a large yield and the crop is well harvested. Considered as a whole, the season has been a profitable one for our farmers. I think that farmers anticipate an increase of prosperity, but prices of farm produce are low, and they sometimes get discouraged. The season has been such that farmers in this section are doing more than the usual amount of fall seeding.

MIDDLESEX COUNTY.

Marlborough (E. D. HOWE). — Root crops have done as well as usual this year. Pears and fall apples have been the least profitable of any of our crops. Raspberries for fruits and corn for grains have been the most profitable. Considered as a whole the season has been a profitable one for farmers, and those with good

business ability anticipate an increase of prosperity in the near future. The great lack with farmers to-day is the ability to dispose of their crops after they have grown them.

Concord (W. H. HUNT). — Root crops have done as well as usual this year. The late truck crops and potatoes and fruit have been the least profitable. Asparagus, strawberries, early truck crops and field corn have been the most profitable this season. Considered as a whole, the season has not been quite as profitable as usual. I do not think that farmers look for a material increase of prosperity in the near future. The price of milk has not been lower than last year, but the cost of production has been increased. All kinds of fruit and vegetables have been lower than usual during the late summer and fall months. Hay is higher than last year, but there is less of it.

Westford (ARTHUR WRIGHT). — Should say that root crops have been better than the average this year. The whole year has been more than an average for all general crops. The apple crop has proved much better than was expected, especially the Baldwin. I should say that the season has been a profitable one for our farmers.

Chelmsford (P. P. PERHAM). — Root crops are better than the average this year. Hay has been the least profitable of any of our leading crops and apples the most so. Considered as a whole, the season has been an average one for profit. Many of the farmers think their business will improve in the near future. The outlook for the New England farmer is much more encouraging than it has been for the last twenty-five years.

Wilmington (C. W. SWAIN). — Root crops have done as well as usual this year. Apples and pears have been the least profitable of our leading crops and potatoes the most so. Considered as a whole, the season has been a profitable one for farmers. I think that they anticipate an increase of prosperity in the near future. All farm crops have been abundant except winter apples and they are more plenty than was anticipated early in the season.

Winchester (MARSHALL SYMMES). — Root crops have done as well as usual this year. Cabbage has been the least profitable of our leading crops and lettuce the most so. Considered as a whole, the season has been a profitable one for farmers. Gardening is all right for some years to come.

Arlington (W. W. RAWSON). — Root crops have done as well as usual this year. Of the leading crops in this locality, celery has been the least profitable and onions the most so. Considered as a whole, the season has not been a profitable one for farmers.

Up to August 1 the season was very good, but since that time the poorest I ever saw. I think farmers anticipate an increase of prosperity in their business in the near future.

ESSEX COUNTY.

Haverhill (EBENEZER WEBSTER). — Should think that root crops have done as well as usual this year. Hay and corn have been the most profitable of our leading crops. The season has been about an average for profit. I think that farmers anticipate an increase of prosperity in their business in the near future.

North Andover (PETER HOLT, JR.). — Root crops have done about as well as usual this year, with perhaps the exception of turnips. Corn and onions have been our least profitable crops this year. Cabbage, potatoes and hay have been the most profitable. Farmers have little reason to look for an increase of prosperity in the near future, as most crops sell at a low price, and it becomes more and more difficult to procure good farm help. Many of the people in the manufacturing villages are out of employment, and have little money to purchase farm produce. When business starts up farmers will look for increased prosperity, and not till then.

West Newbury (J. C. TARLETON). — Root crops have not done as well as usual this year, on account of the dry weather in August. Potatoes have been the least profitable of our leading crops and hay the most so. Considered as a whole, the season has been a profitable one for our farmers, and they are hoping for better times.

Topsfield (B. P. PIKE). — Root crops have done as well as usual this year. Potatoes have been the most profitable of our leading crops. This has been a year of full average crops. Corn and potatoes have been more than an average in quantity and quality. Prices have been low, but the extra quantity has made them fairly profitable. Considered as a whole, the season has been a profitable one for farmers, and they anticipate an increase of prosperity in their business in the near future.

Ipswich (O. C. SMITH). — Root crops have done much better than usual this year. The hay crop has been our least profitable crop. The potato crop has been the most profitable, the average yield being the largest for many years. Considered as a whole, the season has been a profitable one for our farmers. The price of corn is so high that this crop has been unusually profitable. Farmers generally anticipate an increase of prosperity in the near future. The outlook for fair prices for farm products is the best it ever was. With the exception of the drought in the early spring, the season has been favorable to the general farmer in producing

grain and vegetables. (The above answers are based on the net income of crops per acre.)

Danvers (C. H. PRESTON). — Root crops have done as well as usual this year. Squashes and potatoes have been very low in price, but good crops. I think the large crops have in a measure made up for low prices.

Marblehead (W. S. PHILLIPS, JR.). — Root crops have done better than for the past few years. Squashes, especially soft-shelled varieties, and cabbage have been our least profitable crops. Onions have been the most profitable and potatoes stand next. The bountiful crops and quick markets have made a fairly profitable season, in spite of the fact that prices have ruled low. As a rule, farmers do not anticipate an increase of prosperity in their business in the near future.

NORFOLK COUNTY.

Aron (S. F. OLIVER). — Root crops have done as well as usual this year. Corn has been the least profitable of our leading crops and potatoes the most so. Late fruits have been secured without being touched by frost. Apples are of an unusually good quality, and the yield has been fully up to the standard. Dairymen expect their cattle to be in good condition for the winter. It has been a very good season for our farmers. Present indications show that farmers anticipate an increase of prosperity in the near future.

Medfield (G. R. CHASE). — Root crops have done better than usual. Apples have been the least profitable of our leading crops and corn has been the most profitable. The season has been a profitable one for dairymen, if you consider the prices obtained, but not if you consider the high price of grain. Do not think that our farmers as a class anticipate any increase of prosperity in their business. A few do, but fail to give any good reason for their hope.

Millis (E. F. RICHARDSON). — Root crops have not done quite as well as usual this year. Hay and cranberries have been the least profitable of the leading crops in this locality. Potatoes and corn have been the most profitable. Considered as a whole, the season has been a profitable one for farmers. I think the farmers in this locality anticipate an increase of prosperity on account of the business boom here.

Medway (M. MORSE). — Dairy products have been the least profitable of any agricultural products this year. Potatoes have been the most profitable of our leading crops. The season has been fairly profitable, but very large crops with very low prices,

as we have had this year, are not very profitable. Farmers wish an increase of prosperity, and perhaps the wish fathers a hope.

Franklin (C. M. ALLEN). — Root crops have done as well as usual this year. Hay has been the least profitable of any of our leading crops and potatoes and corn the most so. Our farmers cannot pay two per cent on investment. There is no money in farming outside of specialties with glass attachment. I think that farmers anticipate an increase of prosperity in their business in the near future.

BRISTOL COUNTY.

North Raynham (N. W. SHAW). — Root crops have done fully as well as usual this year. There has been little if any profit in the apple crop. Indian corn has proved the most profitable of any of our crops, if the fodder is taken into account. Crops have been good this year, and as a whole have been fairly remunerative. I think it is the general belief that the protection now afforded and that anticipated has led farmers to anticipate greater success in the future.

Berkley (R. H. BABBITT). — I do not think root crops have done as well as usual this year. Strawberries have been the least profitable of our leading crops. Potatoes and onions have been the most profitable, although there was not much money in them. The season has not been a profitable one for our farmers. I think that the best farmers are looking for better times.

Dighton (A. W. PAUL). — Root crops have done as well as usual this year. The crops as a whole have been abundant, and prices low. Farming has been successful and farmers are expecting more profits in the near future.

Somerset (JOSEPH GIBBS). — Root crops have done as well as usual this year. Strawberries have been our least profitable crop and potatoes our most profitable one. I do not think that as a whole this season has been a profitable one for our farmers. The strawberry crop, which is the leading money crop of this section, has been the least profitable one for years. The potato crop was good, but prices have ruled low. Early and late cabbage barely paid expenses. Hay crop light, but perhaps higher prices will make up part of the shortage. Rowen was an entire failure. I do not think New England farmers anticipate an increase of prosperity in the near future.

Swansey (F. G. ARNOLD). — Root crops have done as well as usual this year. Potatoes have been our least profitable crop and corn our most profitable one. Considered as a whole, the season

has been a profitable one for our farmers. I think farmers anticipate an increase of prosperity in their business in the near future.

Westport (A. S. SHERMAN). — Root crops have not done as well as usual this year. Potatoes have been the least profitable of our leading crops and corn the most so. The corn crop is nearly all harvested, and is a very good yield. Potatoes, apples and onions are very plenty, and prices unusually low. This season has been about as profitable as usual, but when we allow for fertilizer and labor the profits are very small indeed. I do not see how there can be an increase of prosperity. Prices of farm products are very low, help scarce and wages high. The prospect is that hay will bring a better price than usual this year. On account of the drought, turnips are small.

PLYMOUTH COUNTY.

Lakeville (ELBRIDGE CUSHMAN). — Root crops have done as well as usual this year. Potatoes have been the least profitable of any of our leading crops and corn has been the most profitable. The season has been about an average one so far as profit is concerned. Farmers are hopeful for an increase of prosperity in their business, but are not over-confident.

Middleborough (A. H. EATON). — Root crops have done as well as usual this year. Potatoes and fruit have been the least profitable of our leading crops, while corn has been the most so. Considered as a whole, the season has hardly been a profitable one for farmers. I do not think that farmers anticipate any increase of prosperity in their business.

Marshfield (G. J. PETERSON). — Root crops have perhaps done better than usual this year. In a year of general prosperity it is difficult to determine which crop has been the least profitable. The large yield of potatoes, the large crops, generally, make up an average of general prosperity among the farmers of this locality. Fruits especially are abundant, and contribute in a large measure to the health and general prosperity of the community. The grass crop has been the most profitable of any of our leading crops. As a general rule, farmers look forward to an increase of prosperity in the near future.

Hanson (Dr. F. S. THOMAS). — Root crops have done as well as usual this year. It is difficult to say which crop has been the most and which the least profitable. Milk farms and market gardens are about the only things in the farming line that are very profitable in Hanson. Considered as a whole, the season has been a profitable one for our farmers. I do not think that farmers anticipate an increase of prosperity in the near future.

Wareham (A. SAVARY). — Root crops have been about an average this year. Corn has been the least profitable of our leading crops and cranberries and hay the most so. Considered as a whole, the season has been a profitable one for farmers. I think that farmers anticipate an increase of prosperity in the near future. Taken altogether, the season has been a remarkable one. There have been two severe droughts, the early summer one cold and the September one very warm. No noticeable frost until the 24th, when quite thick ice formed and the ground was crusted. Have had severe storms and heavy rains this month. Fall pastures are quite good.

BARNSTABLE COUNTY.

Falmouth (D. R. WICKS). — As a whole, root crops have done as well as usual this year. Turnips have been our least profitable crop, on account of the drought which delayed planting. Potatoes have been the most profitable of our leading crops. Considered as a whole, I think the season has been a profitable one for farmers. I think there is a prospect of an increase of prosperity in the near future.

Mashpee (W. F. HAMMOND). — Root crops have done as well as usual this year. Corn and hay have been our least profitable crops and potatoes and cranberries our most profitable ones. This season has been a very profitable one. Farming grows better every year.

Dennis (JOSHUA CROWELL). — Root crops have done as well as usual this year. Hay has been the least profitable and cranberries the most so of any of our leading crops. Considered as a whole, I think the season has been a profitable one for our farmers. I cannot say whether farmers look forward to an increase of prosperity in their business in the near future.

DUKES COUNTY.

West Tisbury (W. J. ROTCH). — Root crops have done as well as usual this year. Hay has been the least profitable of the leading crops in our locality and potatoes the most so. The season has been about as profitable as the average. No material increase of prosperity is in sight.

NANTUCKET COUNTY.

Nantucket (C. W. GARDNER). — Root crops have not done as well as usual this year, owing to dry weather in August and September. Early corn has been the least profitable of our leading crops and potatoes have been the most profitable. Considered as a whole, the season has not been a profitable one for our farmers. I think that farmers anticipate an increase of prosperity in the near future.

INSECTICIDES

AND

THEIR APPLICATION.

COMPILED UNDER THE DIRECTION OF THE
SECRETARY OF THE STATE BOARD OF AGRICULTURE,
BY F. H. FOWLER, B. SC., CLERK,
FOR THE INFORMATION AND USE OF THE AGRICULTURISTS AND
FRUIT GROWERS OF THE COMMONWEALTH.

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NEED OF INSECTICIDES.

Says Prof. S. T. Maynard, in Bulletin No. 11 of the Hatch Experiment Station of the Massachusetts Agricultural College, January, 1891 : “ Another season has demonstrated how dependent we are for profitable crops upon the absence of fungous diseases and injurious insects, and the necessity of safe and easily applied remedies. The apple crop though small would have been a very valuable one in Massachusetts but for the ravages of the codling moth and the apple scab, which have rendered thousands of barrels worthless. The pear crop has been seriously injured by the codling moth and pear or apple scab. The plum crop was almost a total failure on account of the ravages of the plum curculio and the black wart. The grape crop, although on the whole one of the best ever harvested in New England, was in many sections seriously injured by the grape rot which injured the fruit, and the mildew which destroyed the foliage or so injured it as to retard ripening. It is the belief of many practical fruit growers and market gardeners that from one-third to one-half of the entire products of the orchards and gardens of the State are destroyed by insects and fungous diseases.”

Says Dr. J. C. Neal, in Bulletin No. 9 of the Experiment Station of Florida, April, 1890 : “ It is very common to ridicule the efforts of practical entomologists, and belittle the results obtained by their methods of preventing or mitigating the ravages of insects, but the fact remains that at no distant date no farming will be a success without considerable knowledge of the habits of insect foes and the means devised to oppose them.

“ Already in many sections the agriculturist realizes that he may fertilize his soil, plant the best of seed ; it may rain,

the sun may shine, still his crops are at the mercy of his insect enemies, and he reaps a paying crop, or is ruined at the sweet will of despicable intruders who make up in numbers what they lack in strength."

The preparations and instruments for combating injurious insects and fungi have multiplied at an exceptional rate during the past five or six years. A good many of those now sold have stood the test of real use in the garden and orchard, and some of them are doubtless to be considered a permanent part of the farmer's equipment for the successful prosecution of his profession.

Prof. C. M. Weed, in Bulletin, Vol. III., No. 4, Ohio Agricultural Experiment Station, April, 1890, says: "The introduction of the spraying machine into American horticulture marks an advance almost as important as was marked by the advent of the improved cultivators into our agriculture. Before the latter were introduced the weeds that infest the soil were fought by the hand-hoe, but now a single team does the work of many men. In the same way, until recently, various laborious and partially effective methods were used in fighting noxious insects and destructive fungi; but now many foes of both these classes are fought on a large scale by the force-pump and spray-nozzle, and every season adds others to the list of those against which this method may be successfully used. With a large class of farmers and fruit growers spraying has become a recognized part of the season's operations."

INSECT LIFE.

Before considering remedies it will be well to notice briefly the stages in insect life.

"The *larva* or *caterpillar* is the first stage of the insect after it is hatched from the egg. The *pupa* or *chrysalis* is the next stage; during this period the insect is inactive and does not eat. The *imago* or *perfect* insect is the highest stage in the development. According to its classification this form is generally known as a beetle, a moth or a butterfly. In this form only can sexes be distinguished, and in this form only is reproduction possible. These transformations require a relatively short time, and several generations

of the perfect insect can be developed during one season. In some cases these changes are well marked: in others, the transformations are less complete, as in the case of plant lice and grasshoppers." (Bulletin IV., Delaware College Agricultural Experiment Station.)

INSECTICIDES.

"Insecticides, or the substances used for destroying insects, may broadly be divided into two classes: (1) internal poisons, or those which take effect by being eaten along with the ordinary food of the insect; and (2) external irritants, or those which act from the outside, closing the breathing pores, or causing death by irritation of the skin. Besides these, however, various other substances are used in preventing insect attack, — keeping the pests away because of offensive odors, or acting simply as mechanical barriers.

"The most important insecticides are the poisons. Of these the most popular are the various combinations of arsenic, known as Paris green, London purple, slug-shot, and a large number of patent insecticides sold under various names." (Bulletin, Vol. II., No. 1, Ohio Agricultural Experiment Station, March, 1889, Weed.)

Other insecticides are kerosene, petroleum, whale oil soap, resin or arsenical soaps, the oils of tansy, mint, pennyroyal, cedar, tar or cade, thymol, cresylic acid, carbolic acid, alcohol, pyrethrum, hellebore, sulphur, quassia, tobacco, etc. All are valuable; but for most insects, arsenic in some form is most efficacious.

PRINCIPAL INSECTICIDES.

Arsenic. — Pure white arsenic or arsenious acid was successfully used for the destruction of the canker worm as early as 1875, and is still sometimes recommended for the destruction of insects but, fortunately, is rarely used. Whether it can be advantageously applied in cold water is still a question as it is so heavy it quickly settles to the bottom of the vessel. When we add to this fact the increased danger to human life that is incurred by having in the house so deadly a poison, that cannot be distinguished in color from flour,

saleratus, baking powder, and other materials used in cooking, it would be unwise in the extreme to recommend it, especially if it be in solution, for insecticidal purposes.

Paris Green. — This is an arsenite of copper and was brought into prominence as an insecticide for the first time in this country in 1869. It was first used for destroying the potato beetle. It varies somewhat in composition but there is generally over fifty per cent of arsenic in that which has not been adulterated. The commercial Paris green is undoubtedly more or less adulterated, and that sold in the market for the destruction of insects probably never contains fifty per cent of arsenic, and may contain no more than thirty per cent. It is practically insoluble in water and may be applied either dry or wet. In the former case it should be well mixed with some fine powder as a diluent; plaster, air-slaked lime, flour, road-dust, and finely-sifted wood ashes, all answer the purpose fairly well, though lime or plaster are usually preferable. The proportion of poison to diluent varies greatly with different users, — one part poison to fifty, and even one hundred, of diluent, will usually be effective, if the mixing be thoroughly done. Care should be taken to apply lightly and to all parts. To most low plants this application can be easily and rapidly made by enclosing the powder in a muslin bag, which is shaken over the plants. All dry applications are best made in the early morning when the dew is on, or after a shower. If applied in water the amount of Paris green that can be safely used varies according to circumstances. The opinions of various scientific experimenters as to the proper proportions are given later on in the work. The arsenites, either dry or in water, may be used against the different potato beetles, the flea beetles, the cucumber beetles, the cabbage worms (before the plants begin to form heads), the codling moth, the tent caterpillar, the canker worm, the curculio, and many other leaf feeding insects.

The chief objection to Paris green is that it is so heavy that it settles quickly to the bottom of the vessel, very much more quickly than London purple, and consequently should be kept stirred when using. It is also more expensive than London purple.

London Purple. — This is a by-product in the manufacture of aniline dyes, produced by Hemingway's London Purple Company, of London, England. It contains nearly the same percentage of arsenic as Paris green and is much cheaper. It is principally an arsenite of lime, with nearly a quarter of its weight of coloring matter. According to an analysis of Dr. Collier it contains about forty-three per cent of arsenic. It is a finer powder than the Paris green and consequently remains in suspension longer. It may be used in the same way, as a powder or in water.

Kerosene Emulsion. — Probably next to the arsenites — London purple and Paris green — no single insecticide equals in value the kerosene and soap mixture or kerosene emulsion. This insecticide kills by coming in external contact. It is prepared by dissolving one-half a pound of soap in one gallon of water. Remove from the fire when boiling hot, add two gallons of kerosene, and agitate briskly for ten minutes, when the whole should be a frothy, creamy mass. On cooling, the emulsion will set in a gelatinous mass that will remain indefinitely without separating, and at any time may be diluted in water to the desired strength and used. In a good emulsion the particles of kerosene are so small that when put in water they will not quickly rise to the surface. A strength often recommended is secured by putting one part of the emulsion, as above prepared, in nine parts of water. Kerosene, used pure, will kill any insect or plant to which it is applied. The object in making the emulsion is two-fold: to lessen the expense of the application, and to prevent injury to the plants to which it is applied for the destruction of insects. It should always be applied with a good force-pump. "It is doubtless better to throw all liquid insecticides with force in spraying for injurious insects; with the kerosene emulsion it is absolutely essential to success" (A. J. Cook). The kerosene emulsion is excellent in destroying plant lice, scale or bark lice, many of the bugs, and not a few caterpillars, grubs and slugs. Its great value lies in its excellence as a specific against aphides or plant lice. Even the eggs can be killed by its use early in the spring, just before they hatch.

Pyrethrum. — This insecticide is a vegetable powder obtained by grinding the flowers of two species of plants belonging to the genus *pyrethrum*. It is also known as bupach, persian insect powder, dalmatian insect powder and insect powder. Its power to destroy life resides in a volatile oil, which acts on the nervous system of the insect, and which is readily lost on exposure to the atmosphere — hence the difficulty often experienced in procuring it sufficiently fresh and of the desired strength. It is harmless to man and the higher animals, and kills insect life only by contact.

It may be used dry or with water, or in fumes by burning. When used dry the powder may be applied pure or diluted with several times its own bulk of flour, road-dust, sifted ashes, etc. In the former case it should be used very sparingly and in the latter more freely. It may be dusted from a muslin bag or used in one of the many manufactured blowers. The powder is more effectual when applied in the dry way and in the early morning, when the dew is still on and the insects are numb and damp. If used in the wet way one ounce should be put in three gallons of water. In order to get the full strength the powder should be wet up and allowed to stand twenty-four hours, or else prepared as a decoction in boiling water.

This remedy is especially useful in destroying many soft-bodied insects that are not protected by hairs, as the larvæ (worms) of many of the butterflies and moths, plant lice, house flies, mosquitoes, cucumber beetles, etc.

Hellebore. — This insecticide is obtained from the powdered leaves, flowers and roots of *Veratrum alba* or American white hellebore. It is a vegetable poison, but much less dangerous than the mineral arsenical poison; and kills both by contact and by being eaten. When applied dry, this powder may be diluted with five to ten parts of flour and dusted on the plants through a muslin bag. As a rule, this poison should be applied in the evening, because many of the saw-fly larvæ feed mostly during the night; and second, because the powder loses its strength very much more rapidly in the daytime. It is used in the wet way mixed with water in the proportion of one ounce to a gallon or six quarts and

then applied as a spray. It is especially excellent for destroying the imported currant worm.

Tobacco Decoction. — The use of tobacco smoke in closed rooms, like forcing houses and conservatories, is too well known to need remark. That a decoction is also very valuable is perhaps not so well known. For this purpose even the stems or refuse powder will answer well. A pound of tobacco to two or three gallons of water makes an effective decoction, and may be prepared by turning boiling water on to the tobacco, and when cool strain out the tobacco, and the decoction is ready for use.

Carbolic Acid Emulsion. — This is made like kerosene emulsion, only stronger. Use one part of crude carbolic acid to from five to seven parts of the soap solution. It is very valuable for the destroying of apple tree bark lice and apple tree borers, and is easily applied.

Bordeaux Mixture. — This is a valuable fungicide, and has for some years been employed in European countries as a preventive of fungous attacks on grapes. It is prepared as follows: Six pounds of sulphate of copper are dissolved in six gallons of hot water; in another vessel four pounds of fresh lime are slaked in six gallons of cold water. After the latter solution has cooled slowly turn it into the other solution and add ten gallons of water. This when all is thoroughly mixed is ready for use. In using it must be kept agitated to keep the precipitate formed in suspension. Prof. C. M. Weed of the Ohio Experiment Station has shown that when this is used to spray plum trees, the plum rot is wholly kept in check. Professor Weed recommends that in spraying for the curculio, we use this Bordeaux mixture instead of water; that is we add one pound of London purple to two hundred gallons of the Bordeaux mixture. Thus we may not only defend against the curculio but the rot as well.

Professor Garman, of the Kentucky Agricultural Experiment Station, states in Circular No. 3 of that station, that from experiments conducted there, he is satisfied that it is a valuable protection against the injuries from gnawing insects, and that for injury from the striped cucumber beetle, the flea beetles on turnips and potatoes, the blister beetle on potatoes, and the like, nothing better can be used.

Lime dusted on the leaves of plants liable to be eaten by insects is often found useful in the gardens. It is very commonly used to prevent the gnawing of flea beetles and the striped cucumber beetle. Bi-sulphide of carbon and cyanide of potassium are powerful insecticides, but the inflammability of the former and deadly poisonous properties of the latter make their use extremely dangerous. There are many other preparations used for insecticidal purposes, but want of space will prevent further enumeration.

SPRAYING MACHINERY.

Within the last ten years a large number of spraying outfits have been placed upon the market. They are of all shapes and sizes, and suitable for a great many purposes. The main points of a good machine are that the pump shall be durable, work easily and throw a forcible stream; and that the nozzle shall throw a fine spray a considerable distance, and be so constructed that the size and quality of the stream may be regulated at the will of the operator. It is better, and where the copper fungicides are used is essential, that the parts touched by the liquid be made of brass (Prof. C. M. Weed). In case only a few trees are to be sprayed, a cheap hand pump will frequently do very well. Some form of these can be obtained at almost any hardware store. Among the numerous manufacturers of spraying machinery may be mentioned the following, from whom no doubt upon application full descriptive catalogues may be obtained: Field Force Pump Company, Lockport, N. Y.; Gould's Manufacturing Company, Seneca Falls, N. Y.; Nixon Nozzle and Machine Company, Dayton, Ohio; P. C. Lewis, Catskills, N. Y.; Rumsey & Co., Seneca Falls, N. Y.; Thomas Woodason, 451 East Cambria Street, Philadelphia, Pa.; W. & B. Douglas, Middletown, Conn.

SPRAYING WITH ARSENITES.

“The spraying with London purple or Paris green should be done soon after the fruit has ‘set’, and a second spraying should follow for late apples, in from two to three weeks. One spraying should suffice for early fruit. Never spray with Paris green or London purple late in the season,

or near the time of ripening of fruit. The spray should be as fine as possible, — a mist so fine that it will reach every part of the foliage, as well as the fruit. Do not use an ounce of fluid beyond what is necessary to accomplish this. From a gallon to a gallon and a half is enough for most orchard trees. It should not take more than a minute to spray one tree." (Circular No. 3, Kentucky Agricultural Experiment Station, Garman.)

"Another very important point has been suggested by the past season's experience with these insecticides; I refer to the danger of applying them before the blossoms fall. Bees are quite as susceptible to these poisons as are the codling moth and curculio. In their good work of collecting nectar and fertilizing the blossoms they are very certain to take the poison as well, if the trees have been sprayed. Of course there is no excuse for spraying at so early a date, as neither the curculio or codling larvæ commence their attack till the blossoms fall. Thus for the object in mind, as well as for the safety of the bees, delay should be insisted upon. I think we as scientists and all educated men should pronounce vehemently and with one voice against spraying our fruit trees with arsenites till the blossoms have all fallen." (Bulletin No. 53, Michigan Agricultural Experiment Station, A. J. Cook.)

Prof. A. J. Cook says further in Bulletin No. 53 that from his experiments he is warranted in the following conclusions: "The arsenites and carbolized plaster (one pint of crude carbolic acid to fifty pounds of plaster) will protect against the plum curculio if they can be kept on the tree or fruit. But in case of very frequent rains the jarring method will not only be cheaper, but much more effective. Again, as our wild fruits are more cleared away we must have plums in our orchards to protect the apples from the curculio. When apples are seriously stung they become so gnarled and deformed as to be worthless. It will pay, then, to set plum trees near by or among the apple trees. Then we will escape mischief among our apples from the curculio, and will only need to spray our apples once, to destroy the codling moth, and can treat the plum trees three or four times with Paris green or carbolated lime in case we have

only occasional showers, or can jar the trees when the rains are very frequent. For the apples we can use London purple, one pound to two hundred gallons of water. For the plums we must use Paris green, one pound to two or three hundred gallons of water. If the carbolated plaster is preferred, we use one pint of crude carbolic acid to fifty pounds of land plaster. This is thrown freely over the trees, so as to strike every plum on the tree which is being treated."

"If Paris green is to be used for the destruction of the codling moth, it should not be applied stronger than one pound to one hundred and twenty gallons of water, and not weaker than one pound to one hundred and eighty gallons. If London purple is used, it should not be applied stronger than one pound to one hundred gallons nor weaker than one pound to one hundred and sixty gallons. The above strengths are for the first application. If a second application is to be made, it should be considerably weaker, unless heavy rains have removed nearly all of the first application. The first treatment should be made as soon as the blossoms have fallen, when the apples are not larger than peas. At this time the blossom ends are directed upwards and will collect the poison and retain it for the destruction of the little larvæ when they begin to eat their way into the fruit. If the best results are to be obtained, a second application should be made in a week or ten days after the first. The second application is made necessary if the first is followed in a few days by a heavy rain. Prof. S. A. Forbes, who has probably conducted the most elaborate and painstaking experiments with the arsenites against the codling moth, concludes as follows, in Bulletin No. 1 of the State Entomologist of Illinois: 'The experiments above described seem to me to prove that at least seventy per cent of the loss commonly suffered by the fruit grower from the ravages of the codling moth or apple worm may be prevented at a nominal expense, or, practically, in the long run, at no expense at all by thoroughly applying Paris green in a spray with water, once or twice in early spring, as soon as the fruit is fairly set, and not so late as the time when the growing apple turns downward on the stem.'" (Bulletin No. 5, Iowa Agricultural Experiment Station, Gillette.)

INJURY TO FOLIAGE.

“ The greatest drawback that has heretofore been experienced by those who sprayed with the arsenites is the danger of injuring the foliage, — ‘ scorching ’ or ‘ burning ’ it as is generally said. This may be guarded against by using weak mixtures, keeping the liquid well stirred and applying evenly ; and it is pretty well proven that it is safer to apply on a cloudy day or late in the afternoon, than during the hot sunshine of midday. Of course especial care must be taken to keep all poisons out of the reach of children and stock.” (Bulletin, Vol. III., No. 4, Ohio Agricultural Experiment Station, Weed.)

“ That forcible spraying does, in ordinary cases, damage foliage worse than gentle spraying I have no doubt, but I believe the reason for it to be found in the fact that the leaves are more thoroughly treated in the former case than in the latter.” (Bulletin No. 2, Iowa Agricultural Experiment Station, Gillette.)

“ I think we are warranted in the following conclusions : *First*, London purple is more injurious to the foliage than is Paris green ; and white arsenic, arsenious acid, is more harmful than is either London purple or Paris green. This is doubtless owing to the soluble arsenic which is quite abundant in London purple, and almost absent in Paris green.

“ *Secondly*, Peach foliage is especially susceptible to injury, and cherry foliage the least so of any of the kinds (plum, cherry, apple, willow, elm, maple, pear, peach) treated.

“ *Thirdly*, It would seem that London purple and white arsenic, used just before a rain, are more harmful than when used during a drought. This also accords with the view that the injury comes from the presence of soluble arsenic.

“ *Fourthly*, It would seem that spraying soon after the foliage puts out is less harmful than when it is delayed a few days, or, better, a few weeks.

“ *Fifthly*, London purple may be used on apple, plum, cherry, pear and most ornamental trees, but on these should never be stronger than one pound to two hundred gallons of

water. If the application is to be repeated, as it must be, for the curculio, to prove effective, or if it be used in June or July, Paris green should be used, in the same proportion as above, or else we should only use one pound of London purple to three hundred gallons of water.

“*Sixthly*, If the arsenites are to be used on the peach, to defend against the curculio, Paris green only should be used, and that not stronger than one pound to three hundred gallons of water.

“*Seventhly*, The injury done foliage is never immediately apparent. It usually shows somewhat the second day, but the full injury is frequently not manifest till the fifth day, and often not till the tenth.” (Bulletin No. 53, Michigan Agricultural Experiment Station, A. J. Cook.)

As a result of experiments conducted by the Iowa Agricultural Experiment Station and recorded in Bulletin No. 10, August, 1890, the following conclusions are drawn, which the entomologist (Mr. C. P. Gillette) considers to be well proven from the experiments he reports:—

1. The oldest leaves are most susceptible to injury from arsenical applications. They often turn yellow and drop without showing the burnt spotted appearance.
2. Dews, and probably direct sunlight, increase the injuries done by the arsenites to foliage.
3. Leaves kept perfectly dry can hardly be injured by the arsenites, even when they are applied very abundantly.
4. The only effect of a heavy rain or dashing shower following an application of one of the arsenites is to lessen the injury to foliage.
5. When freshly mixed and applied, London purple is most and white arsenic least injurious to foliage.
6. White arsenic in solution should not be used upon foliage without first adding lime, Bordeaux mixture or some other substance to prevent its injurious effects upon foliage.
7. White arsenic, if allowed to stand many days in water before being applied, will do far greater harm to foliage than if applied as soon as mixed.
8. Lime added to London purple or Paris green in water greatly lessens the injury that these poisons would otherwise do to foliage.

9. Lime added to a mixture of white arsenic in water will greatly increase the injury that this poison would otherwise do to foliage. If the arsenic is all in solution, the lime will then lessen the injury, as in the case of London purple and Paris green.

10. London purple (Paris green and white arsenic have not yet been tried) can be used, at least eight or ten times as strong, without injury to foliage if applied in common Bordeaux mixture instead of water.

11. The arsenites cannot by any ordinary method be successfully mixed in a kerosene emulsion.

12. London purple in sulphate of copper solution does vastly more harm than when applied in water only.

Mr. C. W. Woodworth, the entomologist of the Arkansas Experiment Station, in Bulletin No. 14, September, 1890, publishes the following conclusions relative to the effects of arsenites upon plants:—

1. The injury from white arsenic is seen comparatively very soon after it is applied. London purple is almost as active.

2. Paris green does its injury much more slowly.

3. Young leaves are affected much more quickly than are the old ones.

4. Applications to the lower side of a leaf produce injury more quickly than if the poison is applied above.

5. Except in the case of young leaves, it seems to be the rule that where the greatest injury is produced, a greater proportion is early apparent.

DANGER IN USING INSECTICIDES.

“It has been shown, both by experiment and practice, that there is no danger to be apprehended from eating fruit sprayed either with the compounds of arsenic, or with Bordeaux mixture. It is just as well to keep stock out of orchards for a few days after spraying the trees; but really there seems to be small danger from allowing stock the run of an orchard at all times. If the spray has been properly applied very little of it drops from the leaves afterwards.” (Circular No. 3, Kentucky Agricultural Experiment Station, Garman.)

“There is no danger whatever if ordinary care be used.

This has been proven again and again. We have heard of a few, a very few accidents in proportion to the widespread use of insecticides, and, in these cases, the cause could be traced directly to carelessness." (Bulletin No. 3, Oregon Agricultural Experiment Station.)

"We have it demonstrated that the arsenites are effective against the codling moth, that in their use there is no danger of poisoning the fruit, and when used properly no danger to the foliage, nor to the stock that may be pastured in the orchard." (A. J. Cook.)

Readers of this pamphlet who are interested in insects and fungi are urged to consult Bulletin No. 12, April, 1891, of the Hatch Experiment Station of the Massachusetts Agricultural College, which is a report on insects by Dr. C. H. Fernald; and Bulletin No. 13, April, 1891, of the same station, which contains directions for the use of fungicides and insecticides by Prof. S. T. Maynard; and Bulletin No. 39, April, 1891, of the State Agricultural Experiment Station, which gives information of practical importance upon the treatment of fungous diseases by Prof. J. E. Humphrey. No doubt these bulletins can be obtained upon application to the respective stations.

Commonwealth of Massachusetts.

STATE BOARD OF AGRICULTURE.

GYPSY MOTH DEPARTMENT.

BULLETIN OF INFORMATION.

JUNE, 1891.

BOSTON :
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18 POST OFFICE SQUARE.
1891.

A DANGEROUS INSECT PEST IN MEDFORD.

FROM SPECIAL BULLETIN HATCH EXPERIMENT STATION, NOVEMBER,
1889, C. H. FERNALD.

THE GYPSY MOTH (*Ocneria dispar* L.).

“On the 27th of last June, during my absence in Europe, several caterpillars were received at the Station, from Hon. William R. Sessions, secretary of the Board of Agriculture, with the request for information as to what they were and the best methods of destroying them. These caterpillars were brought into the secretary's office by Mr. John Stetson of Medford, Mass., who stated that they were very destructive in that town, eating the leaves of fruit and shade trees. Mrs. Fernald, who had charge of the entomological work during my absence, determined the insect to be the gypsy moth (*Ocneria dispar* Linn.) of Europe, but as the moths were emerging and laying their eggs for next year's brood, there was nothing to recommend at that time except to destroy the moths and their eggs as far as possible, and prepare for the destruction of the caterpillars when they first appear next spring.

First Importation into America.

“There is a statement in the second volume of the American Entomologist, page 111, published in 1870, and also in Riley's Second Missouri Report on Insects, page 10, that ‘only a year ago the larva of a certain owl moth (*Hypogymna dispar*), which is a great pest in Europe both to fruit trees and forest trees, was accidentally introduced by a Massachusetts entomologist into New England.’

“These are the only notices I have thus far been able to find of the introduction of this insect into America. Mr. Samuel Henshaw and Dr. Hagen of Cambridge have both informed me that the entomologist who introduced this insect was Mr. L. Trouvelot, now living in Paris, but at that time living near Glenwood, Medford, where he attempted some experiments in raising silk from our native silk worms, and also introduced European species for the same purpose. Dr. Hagen told me that he distinctly remembered hearing Mr. Trouvelot tell how they escaped from him after he had imported them.

“It seems, then, that this was an accidental introduction, but that they have now become acclimated, and are spreading and doing so much damage as to cause very great alarm.

Distribution.

“The gypsy moth is abundant in nearly all parts of Europe, northern and western Asia, and it even extends as far as Japan. (In this country it has been found only in nineteen cities and towns of Massachusetts. The whole of Medford, Malden and Everett and sections of Arlington, Melrose, Somerville, Cambridge and Chelsea are thoroughly infested, while in Stoneham, Winchester, Belmont, Saugus, Revere, Lynn, Lexington, Swampscott, Wakefield, Burlington and Charlestown they have been found more or less prevalent.)

Food Plants.

“The food plants of this insect given in Europe are apple, pear, plum, cherry, quince, apricot, lime, pomegranate, linden, elm, birch, beech, oak, poplar, willow, hornbeam, ash, hazel-nut, larch, fir, azalea, myrtle, rose, cabbage and many others. Curtis, in his British Entomology, states that they are sometimes very destructive in gardens. Prof. W. P. Brooks reported this insect as very abundant in Sapporo, Japan, in 1883, and gave strawberry as a food plant in addition to those mentioned above.

“(It has been ascertained by experiment at the office of the Gypsy Moth Department in Malden, Mass., that they will feed on the following-named trees and plants: maple, elm,

willow, horse chestnut, balm of gilead, birch, ash, sycamore, walnut, oak, basswood, witch hazel, pine, spruce, cedar, hemlock, apple, peach, cherry, pear, quince, blackberry, currant, barberry, grape, whortleberry, blueberry, strawberry, hop, cabbage, beet, lettuce, radish, corn, dandelion, woodbine, tulip, hawthorn, azalea, rhododendron, wistaria, hollyhock, wygelia, syringa, rose and Japan quince.)

Danger of Spreading.

“The fact that this insect has now been in this country for the last twenty years, and has not only held its own but has multiplied to such an extent as to cause the entire destruction of the fruit crop and also to defoliate the shade trees in the infested region, is sufficient cause for alarm. The citizens of Medford are immediately interested, but the entire Commonwealth and country are threatened with one of the worst insect pests of all Europe. In 1817 the cork-oaks of southern France suffered severely from the attacks of this insect. One of the papers of that time stated that the beautiful cork-oaks which extended from Barbaste to the city of Podenas were nearly destroyed by the caterpillars of the gypsy moth. After having devoured the leaves and young acorns they attacked the fields of corn and millet, and also the grass lands and fruit trees.

“In 1878 the plane trees of the public promenades of Lyons were nearly ruined by this same insect. Only last summer (1889) I saw the moths in immense numbers on the trees in the zoölogical gardens of Berlin, where the caterpillars had done great injury; and the European works on entomology abound with instances of the destructiveness of this insect. When we consider its long list of food plants, we can see how injurious this insect may become if allowed to spread over the country and become established.

“The opinion was expressed to me by prominent entomologists in Europe, that if the gypsy moth should get a foothold in this country it would become a far greater pest than the Colorado potato beetle, because it is so prolific, and feeds on so many different plants, while the potato beetle confines itself to a small number.

How to Destroy Them.

“All the masses of eggs should be scraped from the trees and other places where the females have deposited them and *burned*. Crushing is not sufficient, as possibly some might escape uninjured. This should be done in the fall, winter or early spring, before the eggs hatch. It is not at all probable that one will find all the egg-masses, even with the most careful searching on the trees in a small orchard; but when one remembers that this insect deposits its eggs on all kinds of shade and forest trees also, it appears a hopeless task to exterminate this pest by an attempt to destroy the eggs. It is a habit of these caterpillars, after they have emerged, to cluster together on the trunks or branches of the trees between the times of feeding, and this affords an opportunity of destroying vast numbers by crushing them; and after they have changed to pupæ they may be destroyed wherever they can be found. The female moths are so sluggish in their flight, and so conspicuous, that they may be easily captured and destroyed as soon as they emerge; yet any one or all of these methods, which have been employed in Europe, are not sufficient for their extermination. At best they will only reduce the numbers more or less according to the thoroughness with which the work has been done. I could not learn that any attempts have ever been made in Europe to destroy this insect by means of poisonous insecticides, and it is to this method that we may look for positive results in this country.

“If all the trees in the infested region be thoroughly showered with Paris green in water, one pound to one hundred and fifty gallons, soon after the hatching of the eggs in the spring, the young caterpillars will surely be destroyed, and if any escape it will be because of some neglect or ignorance in the use of the insecticide. *It will be absolutely necessary to shower every tree and shrub in that region*, for if a single tree be neglected, it may yield a crop sufficiently large to eventually restock the region.

“I can hardly feel confident that all these insects can be exterminated in one year, but if this work of showering the trees be continued during the months of April and May for

two or three years, under competent direction, I have no doubt but that they may be entirely destroyed.

“ This is, in my opinion, the cheapest and surest method of exterminating this pest, but its effectiveness depends entirely upon the thoroughness and carefulness with which it is done, and those who do the work must have authority to shower the trees not only on public but on private grounds.

Description of the Insect.

“ The males (Fig. 1) are of a yellowish brown color, with two dark brown lines crossing the forewings, one at the basal third, the other on the outer third, somewhat curved, and with teeth pointing outwards on the veins. The outer end of all the wings is dark brown. A curved dark brown spot (*reniform*) rests a little above the middle of the wing, and a

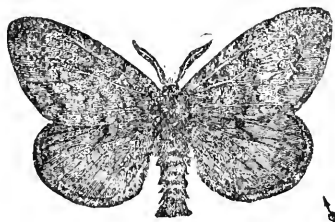


FIG. 1.

small round spot of the same color (*orbicular*) is situated between this and the base of the wing, just outside of the inner cross-line. A similar spot rests near the middle of the base of the wing. The fringes on the forewings are dull yellowish, and broken by eight brown spots. The antennae are strongly bipectinated, or feather-like. The forewings expand about an inch and a half.

“ The females (Fig. 2) are pale yellowish white, with dark brown cross-lines and spots similar to those of the males. The cross-lines in both sexes are much darker and more prominent on the forward edge of the wings (*costa*) than elsewhere. In some specimens there is a faint stripe of brown across the middle of the wing (*median shade*), and a toothed line across the wing near the outer edge (*subterminal line*). The fringes of the forewings have eight dark spots between the ends of the veins, as in the males, and similar but fainter spots often occur in the fringes of the hind wings.

The body is much stouter than in the males, and the antennae are not so heavily feathered. The expanse of wings is from one and three-fourths to two and three-fourths inches.

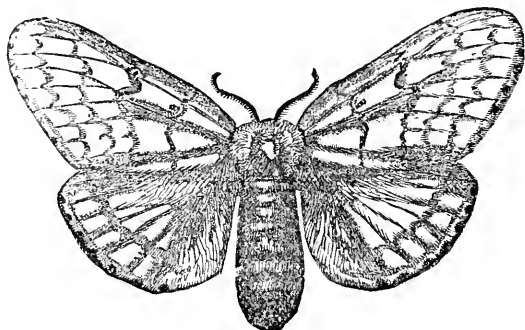


FIG. 2.

“ The eggs are globular, about one-eighteenth of an inch in diameter, nearly salmon colored and with a smooth surface. They are laid on the under side of the branches, on the trunks of the trees, often below the surface of the ground, where the latter has shrunk away from the tree, and not infrequently on the fences or on the sides of buildings. They are laid in oval or rounded masses, often to the number of four hundred or five hundred, and covered with ochre yellow hairs from the abdomen of the female. The eggs are laid in the early part of July, but do not hatch till the following spring. The caterpillars remain together, feeding upon the leaves, and when not feeding they habitually rest side by side on the branches and trunks of the trees.

“ The full-grown caterpillar (Fig. 3) is about an inch and three-fourths in length, very dark brown or black, finely

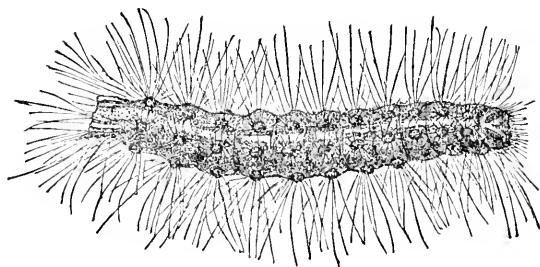


FIG. 3.

reticulated with pale yellow. There is a pale yellow line along the middle of the back and a similar one along each

side. On the first six segments following the head there is a bluish tubercle armed with several black spines on each side of the dorsal line, and on the remaining segments these tubercles are dark crimson red. In the middle of the tenth and eleventh segments there is a smaller red tubercle notched at the top. The whole surface of the body is somewhat hairy, but along each side the hairs are long and form quite dense clusters.

“The pupa (Fig. 4) is from three-fourths of an inch to an inch in length, and varies in color from chocolate to reddish brown. On each side, at the base of the wing-covers, is a dark reddish brown, oval, velvety spot. The wing-cases are quite broad and reach to the posterior third of the fifth segment. The antennae cases are strongly curved, and are quite wide in the middle. There are a few yellowish brown hairs

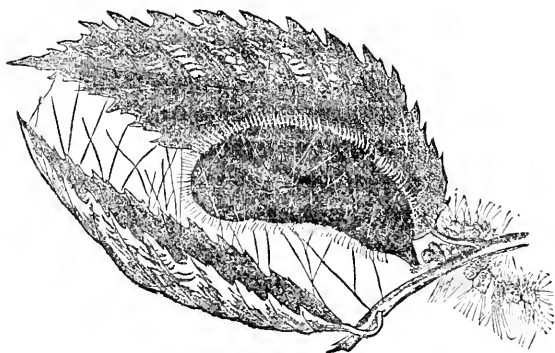


FIG. 4.

on the face and head, also on the first five segments, arranged in broken circles or clusters, which are in longitudinal and transverse rows. The *cremaster* or spine at the posterior end is flattened, rounded at the outer end, grooved longitudinally, and has twelve or more minute hooks at the end. The moths emerge from the pupae from the first to the middle of July.”

The foregoing was prepared by Professor Fernald from knowledge acquired largely from European sources. Observation in this country shows some slight variation in dates of transformation, size of insect in the various stages, etc.

The eggs hatch here later, and consequently spraying cannot commence until May and must be continued through June.

AN ACT TO PROVIDE AGAINST DEPREDACTIONS BY THE INSECT KNOWN
AS THE *OCNERIA DISPAR* OR GYPSY MOTIL.

Be it enacted by the Senate and House of Representatives in General Court assembled, and by the authority of the same, as follows :

SECTION 1. The State Board of Agriculture is hereby authorized, empowered and directed to provide and carry into execution all possible and reasonable measures to prevent the spreading and to secure the extermination of the *Ocneria dispar* or gypsy moth in this Commonwealth; and to this end said State Board of Agriculture shall have full authority to provide itself with all necessary material and appliances and to employ such competent persons, servants and agents as it, said State Board of Agriculture, shall from time to time deem needful in the execution of the purposes of this act; and said State Board of Agriculture shall also have the right itself or by any persons, servants or agents employed by it, said Board, under this act to enter upon the lands of any person.

SECT. 2. The owner of any land so entered upon, who shall suffer damage by such entry and acts done thereon by said State Board of Agriculture, or under its direction, may recover the same of the city or town in which the lands so claimed to have been damaged are situate by action of contract; but any benefits received by such entry and the acts done on such lands, in the execution of the purposes of this act, shall be determined by the court or jury before whom such action is heard, and the amount thereof shall be applied to the reduction of said damages, and the Commonwealth shall refund to said city or town one-half of the amount of the damages recovered.

SECT. 3. Said State Board of Agriculture shall have full authority to make from time to time such rules and regulations in furtherance of the purposes of this act as it shall deem needful; which rules and regulations shall be published in one or more newspapers published in the county of Suffolk; and copies of such rules and regulations shall be posted in at least three public places in each city or town in which said *Ocneria dispar* or gypsy moth shall be found by said State Board of Agriculture to exist, and a copy thereof shall be filed with the city clerk of each such city, and with the town clerk of each such town; and any person

who shall knowingly violate any of the provisions thereof shall be punished for each violation by a fine not exceeding twenty-five dollars.

.

SECT. 6. Any person who shall purposely resist or obstruct said State Board of Agriculture or any persons, servants or agents employed by it under this act, while engaged in the execution of the purposes of this act, shall be punished by a fine not exceeding twenty-five dollars for each offence.

SECT. 7. It shall be unlawful for any person knowingly to bring the insect known as the *Oenaria dispar* or gypsy moth, or its nests or eggs, within this Commonwealth; or for any person knowingly to transport said insect, or its nests or eggs, from any town or city to another town or city within this Commonwealth. Any person who shall offend against the provisions of this section of this act shall be punished by a fine not exceeding two hundred dollars or by imprisonment in the house of correction not exceeding sixty days, or by both said fine and imprisonment.

SECT. 8. The said State Board of Agriculture may exercise all the duties and powers herein conferred upon said Board by and through its secretary and such members of said Board as said Board may designate and appoint to have in charge, in conjunction with its secretary, the execution of the purposes of this act.

At a special meeting of the State Board of Agriculture held April 28, 1891, to consider an act of the Massachusetts Legislature, entitled "An Act to provide against depredations by the insect known as the *Oenaria dispar* or gypsy moth," and to provide for carrying out the provisions of said act, it was

Voted, That Wm R. Sessions, N. S. Shaler and Francis H. Appleton be a committee of the Board to exercise all the duties and powers conferred by the above-mentioned act upon the State Board of Agriculture.

WM. R. SESSIONS,

Secretary.

In view of the prejudice of many people against the use of Paris green in spraying their trees and shrubs, the following extracts from Bulletin No. 13, April, 1891, of the Hatch Experiment Station, Amherst, Mass., and Bulletin No. 53, August, 1889, of the Agricultural College Experiment Station of Michigan, and the fourth report of the United

States Entomological Commission, together with a statement of Prof. C. V. Riley, entomologist of the United States Department of Agriculture, are appended as samples of the opinions and experience of the most reputable scientists and experiment station directors of this country.

* “The destruction of our fruits to so large an extent for the past few years by fungous pests and insects shows us the *necessity* of using every remedy that we know of for the destruction of the causes of this loss.

“The many letters received at this Station asking for specific instructions relating to the use of the best known fungicides and insecticides have led to the issue of this bulletin.

“Our information is based upon the experiments made at this Station, those of the Department of Agriculture at Washington, the work of many other stations of the country, and the practice of the large orchardists and vineyardists of the country, who have made successful use of the remedies.

“The time which experiments have been carried on in this line has not been sufficient to decide *in every case* and under *all conditions*, what may be the most economical and the safest remedy or mode of application, but enough has been learned to warrant the recommendation of the use of a few of the best known remedies, and we feel confident that if the directions are carefully followed and no unusual conditions present themselves, great benefit may be derived from their use.

Treatment for the Apple.

1. As soon as the petals have fallen, spray with the Bordeaux † mixture and *Paris green*, one pound to two hundred gallons of the mixture, for the insects and apple scab.

2. Apply the same mixture again in eight or ten days. Should it have *rained hard* within a few days of either spraying, another application must be made at once.

3. In about two weeks spray again with the same mixture.

* Prof. S. T. Maynard, in Bulletin No. 13, April, 1891, of the Hatch Experiment Station of the Massachusetts Agricultural College.

† BORDEAUX MIXTURE (*Formula*).—Dissolve six pounds copper sulphate in two or three gallons of hot water. (If in a powdered form it will dissolve readily in cold water.) Slake four pounds of fresh caustic lime in water enough to make a thin whitewash. When both are cool, pour the two mixtures together, stirring thoroughly, then add water enough to make twenty-five gallons of the mixture. Strain through a fine wire or cloth strainer before using.

Treatment for the Pear.

1. When the fruit has set, *i. e.*, the petals have fallen, spray with the Bordeaux mixture and Paris green.
2. Repeat the spraying in eight or ten days.
3. Spray again with same mixture in two weeks.

Treatment for the Plum.

1. As soon as the petals have fallen, use the Bordeaux mixture and Paris green.
2. Spray again in eight or ten days.
3. Spray again in two weeks.

Treatment for the Grape.

1. Just before the blossoms open, use the Bordeaux mixture and Paris green for the 'rose beetle.'
2. Use the same mixture eight or ten days later, or as soon as the fruit has set.

Treatment for the Strawberry.

1. Apply the Bordeaux mixture and Paris green as soon as the leaves begin to grow vigorously.
2. Use the Bordeaux mixture and Paris green just before the first blossoms open.
3. After the fruit has been gathered, if the bed is to be continued, make one application of the above mixture. The Paris green is included to destroy the '*crown borer*,' which is injurious in some sections."

Injury to the Foliage.

* "Another practical question of no small moment in this use of the arsenites refers to injury to the foliage of the trees treated. In an elaborate series of experiments the past season we desired to learn the effect on different trees of the different arsenites, and whether the date of treatment and atmospheric condition had any influence. . . . I think we are warranted in the following conclusions: *First*, London purple is more injurious to the foliage than is Paris

* Prof. A. J. Cook, in Bulletin No. 53, August, 1889, of the Agricultural College of Michigan Experiment Station.

green; and white arsenic — arsenious acid — is more harmful than is either London purple or Paris green. . . . It would seem that spraying soon after the foliage puts out is less harmful than when it is delayed a few days. For ten years I have sprayed both apple and plum trees in May, and for several years with London purple, and often used a mixture as strong as one pound to one hundred or even fifty gallons of water; yet in most cases no damage was done.

Poisoning the Pasture under the Trees.

“ Another important practical question which I have tried to settle this season, 1889, concerns the danger of pasturing under trees which have been sprayed with the arsenites. A gentleman wishing to spray his orchard, in which he was pasturing seventy-five hogs, consulted me as to the wisdom of doing so without first removing the swine. I told him I believed there was no danger. I said use a mixture, one pound of London purple to two hundred gallons of water, watch your hogs closely and if any seem affected remove all at once, and I will be responsible for damages to the amount of twenty-five dollars. The gentleman did so and reports no damage.

“ In the following experiments I used the mixture twice the strength which should be used, that the experiment might be the more convincing. I used one pound to one hundred gallons of water. In every case the spraying was very thoroughly done. Care was taken that every twig and leaf should be drenched.

“ In tree number one a thick paper was placed under one-half of a rather small apple tree. The space covered was six by twelve feet, or seventy-two square feet. The paper was left till all dripping ceased. As the day was quite windy the dripping was rather excessive. In this case every particle of the poison that fell from the tree was caught on the paper. Dr. R. C. Kedzie analyzed the poison and found four-tenths (.4) of a grain. Tree number two was a large tree with very thick foliage. Underneath this tree was a thick carpet of clover, blue grass and timothy just in bloom. The space covered by the tree was fully sixteen feet square, or equal to two hundred and fifty-six

square feet. As soon as all dripping had ceased the grass under the tree was all cut, very gently and very close to the ground. This was taken to the chemical laboratory and analyzed by Dr. R. C. Kedzie. There was found two and two-tenths grains of arsenic. Now as our authorities say that one grain is a poisonous dose for a dog, two for a man, ten for a cow and twenty for a horse, there would seem to be small danger from pasturing our orchards during and immediately after spraying, especially as no animal would eat the sprayed grass exclusively. To test this fully, I sprayed a large tree over some bright tender grass and clover. I then cut the clover carefully, close to the ground, and fed it all to my horse. It was all eaten up in an hour or two, and the horse showed no signs of any injury. This mixture, remember, was of double the proper strength, was applied very thoroughly, and all the grass fed to and eaten by the horse. This experiment was repeated with the same result. I next secured three sheep. These were kept till hungry, then put in a pen about a tree under which was rich, juicy June grass and clover. The sheep soon ate the grass, yet showed no signs of any injury. This experiment was repeated twice with the same result. It seems to me that these experiments are crucial and settle the matter fully. The analyses show that there is no danger; the experiments confirm the conclusion.

“Thus we have it demonstrated that the arsenites are effective against the codling moth, that in their use there is no danger of poisoning the fruit, and when used properly no danger to the foliage, nor to stock that may be pastured in the orchard.”

* “Not only hundreds of tons, but thousands of tons of these mineral poisons have been employed during the past decade by farmers throughout the country, whether to protect the potato crop, or the cotton crop, or other products of the soil from the ruinous attacks of insects. The general experience during this long period and over the whole country is so emphatically in favor of their use, and their perfect safety and harmlessness, with ordinary precautions, as to render

almost laughable the objections of the few persons referred to. No advancement, no improvement, no general benefit to the human race is ever accomplished without some attendant danger, and those who inveigh against such improvements as increasing the risks to life stand on the same footing as the opponents to arsenical poisons as insecticides."

UNITED STATES DEPARTMENT OF AGRICULTURE,
DIVISION OF ENTOMOLOGY, WASHINGTON, D. C., May 26, 1891.

MR. WM. R. SESSIONS, *Secretary Massachusetts State Board of Agriculture, Boston, Mass.*

DEAR SIR:—Your favor of the 21st instant duly received. In reply I may state that . . . I consider that the prejudice you refer to (against the use of Paris green in spraying), on the part of Massachusetts fruit growers, is totally unjustified, from a long experience covering some fifteen years; and while I do not advise recklessness in its use, I feel no hesitation in saying that its use in the manner and for the purpose which you have in mind (spraying with Paris green to destroy the gypsy moth) involves no danger to man or beast if proper care be taken in the mixing and spraying.

Yours very truly,

(Signed)

C. V. RILEY,
, *Entomologist.*



